Amateur Radio

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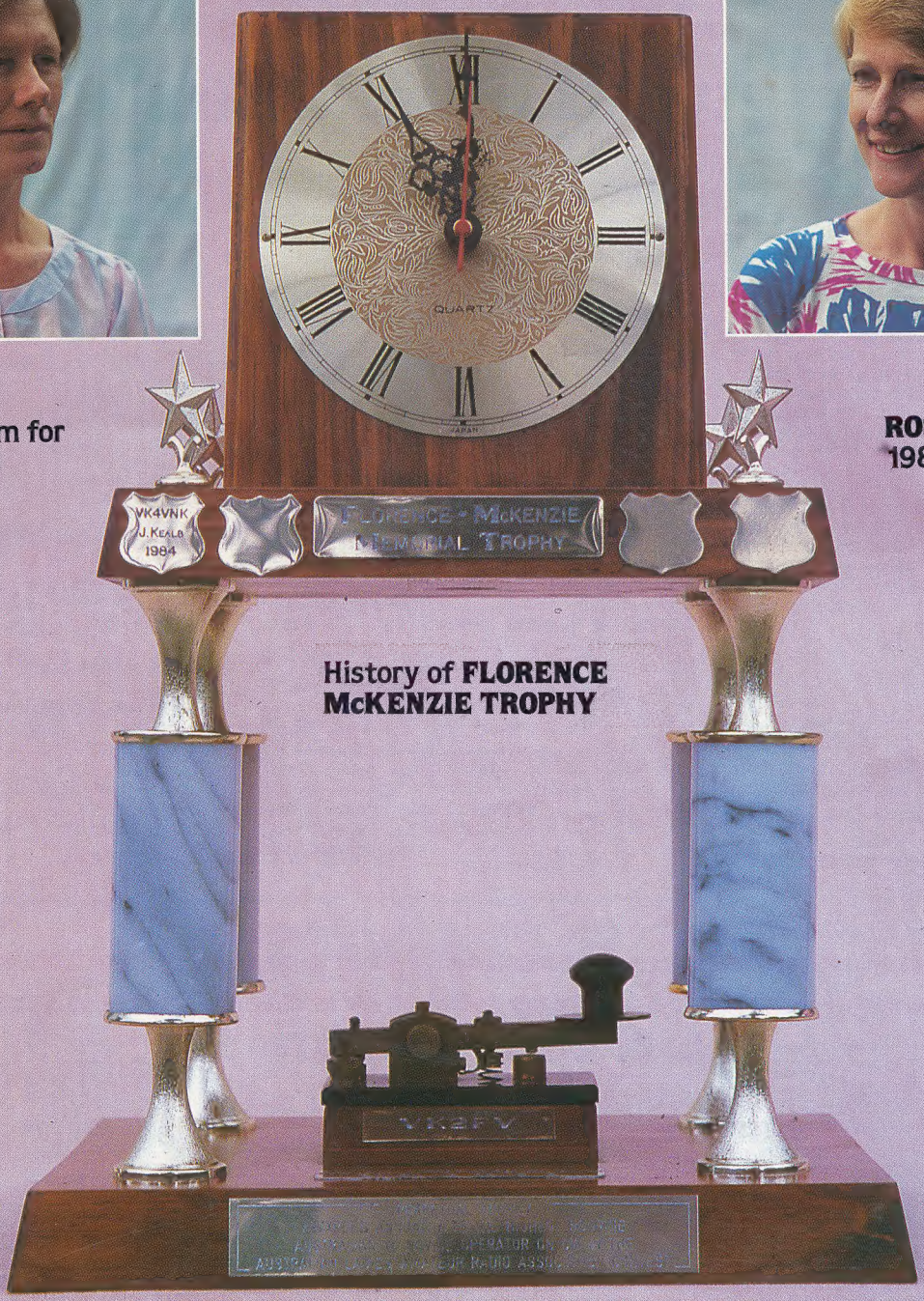

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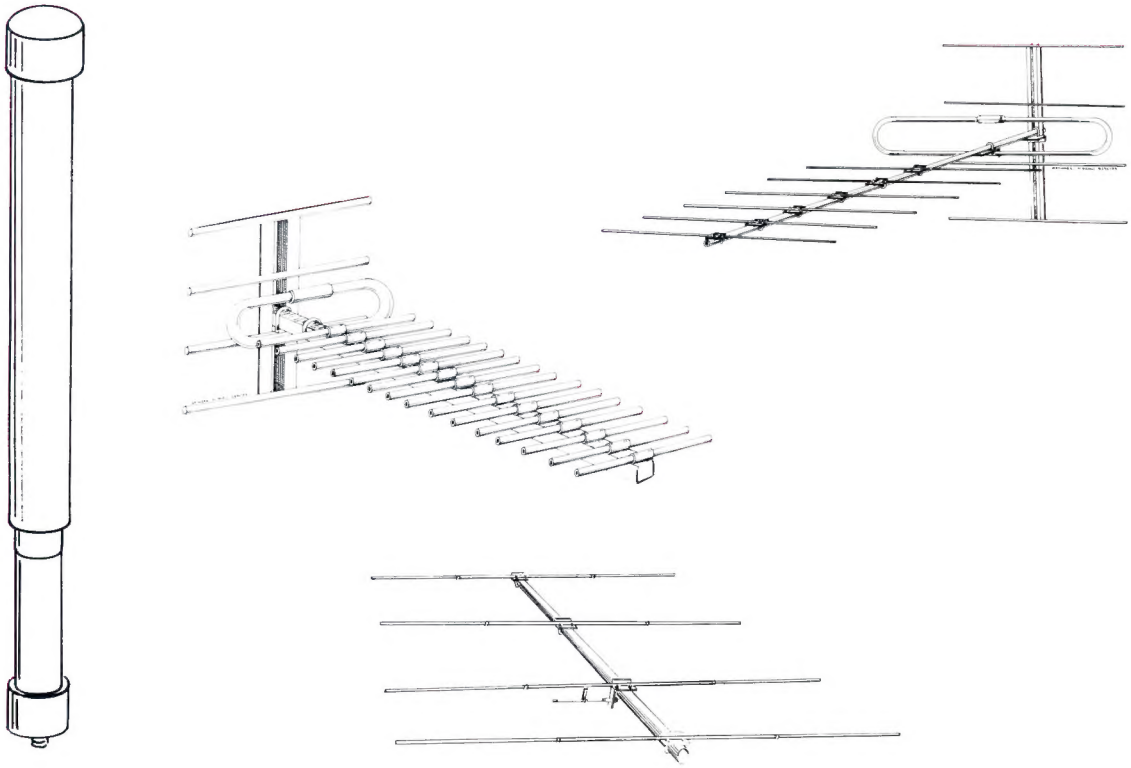

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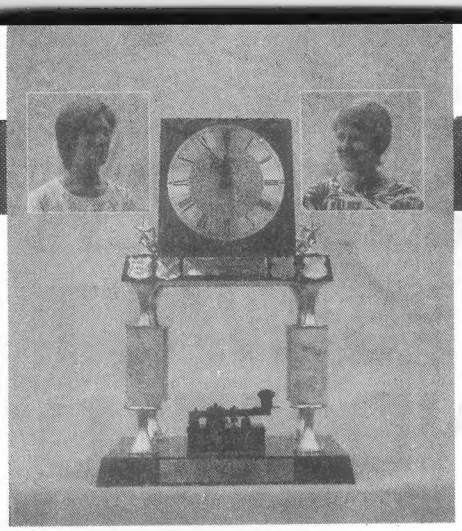

DESIGN KEN McLACHLAN VK3AH

Cover photograph features the Florence McKenzie Memorial Trophy, together with Jill VK4ASK ex-VK4VNK, (left) and Wendy VK4BSQ.

Amateur Radio

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Catering for the RTTY enthusiast there is a fine project from another avid home brewer, who has a shack which is a sight to behold. It contains 90 percent of all the 'goodies' that have been designed and built by Peter VK3AZL, a member of the Publications Committee.

Computer orientated? This program with a description of how it operates is a must for you. Joseph VK7NJO, has produced an excellent article of how to solve 10 options of AC and DC equations that every amateur forgets from time to time.

Bob VK7KZ, with members of his family journeyed to the United Kingdom and caught up with Jack Sykes (refer p49 July AR). It is an interesting story and with AR at heart, Bob wrote about his visit to see Jack and came away with an unusual but true story that Jack would like to share with the readers of this magazine.

For those contemplating travelling overseas, a list of countries that have reciprocal licensing arrangements with Australia's administration should be of interest. One may find it on page 22.

Other items of interest in this months issue, apart from the regular columnists, include an equipment review on the FRG-8800 receiver, Know your Second Hand Equipment, the newer and most popular segment Technical Mailbox, (further queries are still required), an article on the WWII T28 transmitter and Jim VK3PC, has a Club Portrait on another Club. Jim, is looking for other clubs to portray and he may be contacted at QTHR.

BKP

DEADLINE

All copy for inclusion in the January 1987 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9am, 10th November 1986.

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Material should be sent direct to **PO Box 300, Caulfield South, Vic. 3162,** *by the 20th day of the second month preceding publication.* **Note:** *Some months are a few days earlier due to the way the days fall. Watch the space below the index for deadline dates.* **Phone: (03) 528 5962.**

HAMADS should be sent direct to the same address, by the same date.

Acknowledgment may not be made unless specifically requested. All important items should be sent by Certified Mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

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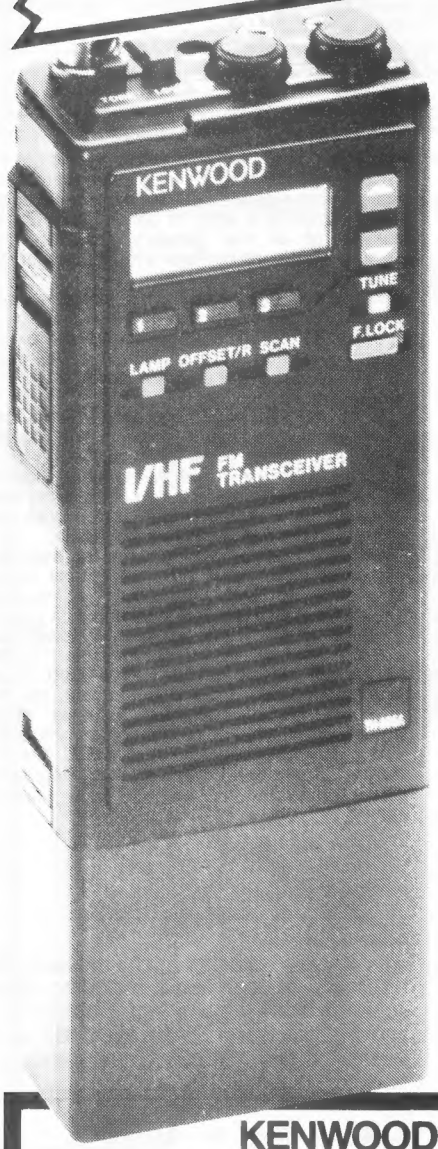

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Editor's Comment

A FUTURE FOR HOME- BREW?

There has been for many years an attitude towards building one's own amateur equipment that "it just isn't worth the trouble any more". We have heard such arguments for a long time now as:

"You can't get the right parts any more",
"Why build gear, perhaps taking years to finish it, when you can earn enough to buy commercial stuff in a few weeks?",
"You can't build anything that looks half as good (or works half as well) as the commercial rig",
"The commercial equipment is so compact and/or versatile. How can you build anything so small or complex?"

Many of these arguments seemed unbeatable until quite recently, but I would like to suggest that the climate is now changing. Let us not forget that the Amateur Service is unique in that its individual operators are legally entitled to build their own radio equipment. All other services either depend on type-approved commercial products or employ their own engineers in their own dedicated workshops. Most of us are not electronics engineers, but unlike operators in the other services we have earned the right to home-brew by passing technical examinations which demonstrate at least the beginnings of competence to build equipment to meet our requirements. Like all rights, this could be lost if we cease to demonstrate the need for it. It has been proposed in Canada, for example, that only the highest grade of amateur licence should carry the right to build one's own. The well-known saying "Use it or lose it!" applies here too.

How has the climate changed? One of the biggest factors is the major shift in exchange rates between Australia and the rest of the world over the last year or two. This has made imports much dearer, but the other side of the coin is that our exporters are now much more competitive. Not only does this mean that it's now more attractive to build here rather than buy from overseas, but Australian manufacturers are beginning to tackle the overseas markets in which hitherto we were over-priced. The August issue of "Electronics News" has a front-page story about the expansion of local industry. Development of new products has doubled in four years. "In-house" rather than imported technology is coming up fast. It may not be long before we once again have a significant components industry. All of these factors are bound to "rub-off" into the amateur field, particularly since many of our "professional amateurs" are involved in this industrial expansion.

There was a recent proposal (by VK3XU, one of our more prolific home- brewers) that we should have an Australian "Amateur Handbook", in which design and construction using locally available components should feature largely. We have had a number of letters indicating willingness to buy such a publication. Hopefully, before long, we may be able to assemble a team of technical authors to write it. Any offers? We may never reach the exalted standards of the ARRL or RSGB Handbooks, but it would be worth a try. Can we do it? Will there be a resurgence of amateur home-brewing? Maybe, right now, it's all starting to happen!

Bill Rice VK3ABP

Editor

WIA News

GENERAL MANAGER

Critical to the effective operation of the Federal organisation of the Wireless Institute of Australia is its full time manager.

The Executive has recently reviewed that position, in the light of the changing requirements of the Institute. It concluded that as well as a need for the management of the business affairs of the Institute, there was a technical aspect of the activities of the Federal Executive that also had to be met. An increasing number of matters involving the Department of Communications and requests from members require at least a technical background.

Accordingly, the Executive has decided to identify its full time manager as the General Manager of the Wireless Institute of Australia. The Radio Society of Great Britain gives the same title to its senior employee, a title that is consistent with the qualification required.

Earl Russell VK3BER, has been appointed the first General Manager of the Institute, as well as its Secretary.

Earl has been an amateur for 16 years, and has recently retired from a Governmental Department where he worked in the communications area for 33 years. He is eminently qualified for the position, having been acting as Business Manager for the last seven months, during the absence of Reg Macey.

The Federal Executive has recorded its gratitude to Reg Macey for his contribution to the Institute as Business Manager since August 1982, and wishes him a speedy recovery.

David Wardlaw VK3ADW
Federal President

Matching Impedance Formula

Dudley Stalker VK3KJ
62 Hart Street, Colac, Vic. 3250

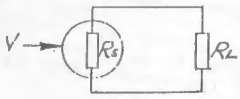
The emphasis on matching of impedances, (transmitter to line, line to antenna), in modern times, has come mainly because of the need to protect expensive output transistors by achieving low SWR.

A fundamental principle, that maximum power in a load coincides with source and load impedance equality, has tended to become obscured.

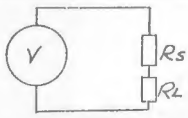
Since the principle is not immediately obvious, recourse to mathematical analysis is required for its proof.

In the following:

V is a voltage source
R_S is the source resistance
R_L is the load resistance



Since, to any current in the above configuration the source and load resistance are in series, we can imagine the source as being of zero resistance, and replace its resistance with an equivalent external resistance.



The voltage across R_L is given by the voltage divider principle as

$$\frac{VR_L}{R_S + R_L}$$

where V is the supply voltage.

R_S is constant, and we may take V as unity. So the voltage across R_L may be written as

$$\frac{R_L}{R_S + R_L}.$$

The power in R_L is given by the usual V^2/R, which in this case becomes

$$\frac{\left(\frac{R_L}{R_S + R_L}\right)^2}{R_L}$$

$$\frac{R_L}{(R_S + R_L)^2}$$

$$\frac{R_L}{R_S^2 + 2R_SR_L + R_L^2}$$

To obtain a maximum for this expression, we differentiate it with respect to R_L and equate the resulting expression to zero.

$$\frac{d_P}{d R_L} = \frac{(R_S^2 + 2R_SR_L + R_L^2) - R_L\ (2R_S + 2R_L)}{(R_S^2 + 2R_SR_L + R_L^2)^2}$$

To equate this to zero, it is sufficient to equate the numerator to zero.

This gives:

$$R_S^2 + 2R_SR_L + R_L^2 - 2R_SR_L - 2R_L^2 = 0$$

From which $R_S^2 - R_L^2 = 0$
From which $R_S - R_L = 0$
From which $R_S = R_L = 0$

The maximum power in R_L therefore occurs when R_S and R_L are equal.

We could, of course, write Z for R in the above working to give a more general expression.

DEPARTMENT OF COMMUNICATIONS

P.O. BOX 34
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TELEPHONE: 64 1177
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REFERENCE: 86/1933

Mr E Russel
Federal Secretary
Wireless Institute of Australia
PO Box 300
CAULFIELD SOUTH VIC 3162

Dear Mr Russel

I refer to discussions at the Departmental/Institute federal executive meeting, held on 19 August 1986, concerning packet radio, repeater cross-linking and other matters.

At the outset I would like to congratulate the Institute on its packet radio and repeater cross-linking submissions. The papers greatly assisted the Department in its consideration of these two new amateur operating concepts for amateurs in Australia.

I am pleased to advise that, from the date of this letter, both "packet radio" and repeater cross-linking is permitted in the Amateur Service. Operation is, however, subject to the conditions detailed in attachments (A) and (B). These conditions will be included in the revised amateur handbook which, as you are aware, is to now be produced as three separate brochures.

Additionally, noting the similarity between packet radio and RTTY, I would advise that use of unattended operation and store/forward techniques employing RTTY is authorised. Stations utilising these modes of operation must, however, conform to the conditions outlined for packet radio in attachment A.

Recognising that version "V2" of the Vancouver packet protocol can not meet the identification requirements stipulated until an updated version is released, the Department is prepared to authorise use of "V2" until 31 March 1987. It is anticipated that version "V3" will be available by this time and it is understood that "V3" will fully comply with the identification requirements.

The Department will authorise the cross-linking of up to three repeater stations. Cross-linking of any number of repeaters for the purposes of WICEN or approved WIA broadcasts will, however, be considered. Each link transmitter must be separately licenced and a fee of $26 per transmitter will apply. Applications to cross-link repeater stations should be forwarded to the relevant State Manager together with comment from the local WIA Division and the repeater licensees.

In relation to the topic of 29 MHz FM repeaters, I am pleased to confirm that the Department will permit this form of operation. The use of 16KOF3E by amateur and amateur repeater stations operating in this band is also authorised. The Department would now be pleased to consider WIA band plan arrangements for repeater operation in the 29 MHz amateur band.

Your assistance to promulgate the information outlined to the amateur fraternity, through the normal channels available to the Institute, would be appreciated. Should you require any additional information in relation to these matters, you should contact Mr W Huxley (telephone (062) 644991) who would be pleased to assist you further.

Yours sincerely

D Hunt

D HUNT
Manager Regulatory
Operations Branch
Radio Frequency Division
CANBERRA

30/9/86

Attachment A

PACKET RADIO

GENERAL CONDITIONS

(1) Novice Amateur Stations shall not use the packet radio transmission mode of operation.

(2) Amateur stations utilising "packet radio" must conform to the general technical parameters and conditions applying to the Amateur Service.

(3) Each "packet" shall contain the originating stations identification, that of the destination station and the station transmitting (if different from the originating station).

(4) Amateur stations employing "packet" in an unattended operating configuration shall be fitted with;

(i) a timer to cause automatic shut-down of the station transmitter after 10 minutes of uninterrupted transmission.

(ii) a fail-safe facility to prevent the station transmitter operating due to equipment malfunction.

(5) An amateur station shall not retransmit a "packet" signal in any amateur band that the originating station is not authorised to use.

(6) Amateur stations when utilising the packet radio transmission mode shall not be connected to the switched telephone network.

IMPORTANT NOTES

(A) Any protocol may be used for "packet" transmission provided it meets the identification requirements stipulated in (3) above.

(B) The use of store/forward packet techniques by stations in the Amateur Service is permitted.

(C) Amateur licensees employing the packet radio mode of transmission are reminded that they are responsible for ensuring that third party traffic conditions are met. This point is especially important to note if using store/forward "packet" techniques on amateur bands below 30 MHz.

(D) Providing the conditions stipulated in (4) above are met, amateur stations may operate in an unattended configuration when utilising the packet radio transmission mode.

(E) Packet repeater stations must comply with the conditions applicable to repeater stations and those conditions outlined above.

Attachment B

REPEATER CROSS-LINKING

GENERAL CONDITIONS

(1) Repeater "cross-linking" arrangements must conform to the general technical parameters and conditions applying to the Amateur Service.

(2) The repeater "link" shall not be used to permit an amateur station to be retransmitted in a band it is not authorised to use.

(3) Each "link" transmitter shall be fitted with;

(i) a fail-safe device to prevent operation due to any malfunction.

(ii) a timer to cause automatic shut-down after 10 minutes of uninterrupted transmission.

(iii) a facility to, when activated, transmit an identification call sign at least once every 10 minutes.

(4) Repeater stations shall not retransmit the call sign of the "linked" station or that of the "link".

(5) The link transmitters shall only be activated, for other than identification purposes, when a received signal is present on any of the "linked" repeater stations.

IMPORTANT NOTES

(A) Cross-linking of up to three repeaters will be authorised.

(B) The conditions outlined in 1 - 5 above also apply to single repeater stations, with split transmitting and receiving sites, which utilise links.

(C) Only frequencies above 50 MHz will be authorised for the cross-links.

(D) Applications to cross-link repeater stations should be forwarded to the State Manager for approval.

(E) Each link transmitter may utilise the call sign of the station at which it is situated for the purposes of identification.

30/9/86

A MULTIBAND END-FED INVERTED-VEE AERIAL SYSTEM

Written by Colin Dickman ZS6U

Reprinted from RADIO ZS, August 1977 and contributed to AR by James Crichton VK2XFC

The following article was originally printed in *Radio ZS,* January 1973, but was reprinted in August 1977 in response to popular requests by readers. It has been contributed to AR by James Crichton VK2XFC.

It is not without good reason that end-fed aerials requiring tuners have fallen from favour to be replaced by systems using untuned transmission lines. Our transmitters and linears have enough knobs without adding an extra three or four to twiddle.

Yet, by a judicious choice of wire length we can produce a situation where the simplest of preset tuners can be used with them resulting in a compact, cheap, easily constructed multiband aerial system with certain advantages over the commonly used multiband aerials.

Suspecting that, lying in obscurity amongst the many pieces at the bottom of the hat there were two which in partnership would emerge as a team deserving of a share of limelight, I delved until out came the pair presented in this article.

CHOOSING THE TUNER

A tuner is a coupling network between the low impedance output of the transmitter (Zot) and the impedance of the input to the antenna (Zia). It must perform one or both of the following:

(a) act as an impedance matching transformer
(b) resonate the aerial system by cancelling any reactance present in Zia.

If Zia is complex, containing widely different amounts of reactance and resistance on each band, a complex tuner is required to cope with it. The less complex Zia, the simpler the tuner. In fact, if we can arrange to keep Zia always greater than Zot we can use L-networks of the step-up variety as depicted in Figure 1, requiring only two adjustments for each band. Both networks will perform the same function but only 1A is capable of suppressing harmonics so this is our obvious choice.

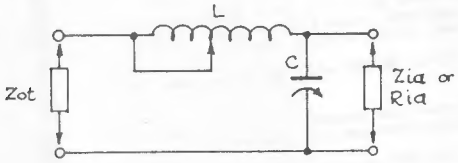

Figure 1a — Low-Pass.

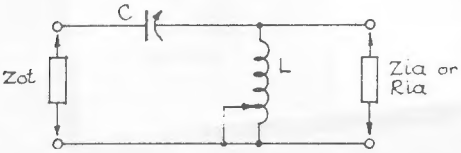

Figure 1b — High-Pass.

CHOOSING THE AERIAL LENGTH

Figure 2, depicts the input characteristics of an end fed aerial showing how the reactance, resistance and the voltage change as the length is varied from 0 to 1 wavelength. The figure applies equally well if the wire length remains constant and the input frequency is varied, and can be extended indefinitely to the left for lengths exceeding one wavelength.

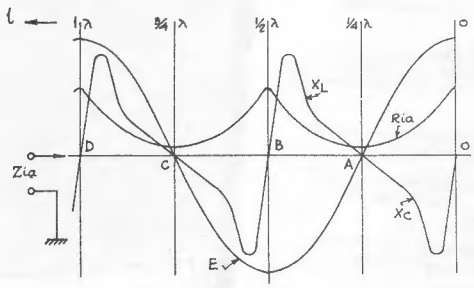

Figure 2.

a) Random Lengths

If the length of the aerial falls between the points O, A, B, C, D the input impedance Zia contains reactance as well as resistance either of which may be high or low depending on the length and the frequency. Clearly, Zia may be low on one band and high on another. Furthermore, the reactance may be capacitive (negative) on one band and inductive (positive) on another, resulting in severe detuning of the tuner's natural resonance in order to provide the required reactance of the opposite sign. Apart from the fact that at least three variable elements are required in the tuner; eg a pi-network, the range of minimum to maximum inductance and capacitance must be large and tuning difficulties are likely at the lowest and highest frequencies. So much for random lengths!

b) Resonant Lengths

OA, OB, OC, OD are all resonant lengths inasmuch as the reactance is zero and Zia becomes a pure resistance which we shall call Ria. For OA and OC, Ria is very low and these lengths lend themselves only to odd-harmonic operation. On the other hand, lengths OB and OD, which are multiples of a half wavelength, are suitable for all harmonics and Ria is a high resistance on all bands. Just what we need for our L-network.

From this, we could choose a half wavelength on 80 metres which would be two halfwaves on 40, four on 20, six on 15 and eight on 10. But, by making our length a quarter-wave on 80 we can make our aerial half as long and since Ria will be in the same order as Zot on 80 metres, we can arrange the switching in our L-network so that the aerial bypasses the network direct to the transmitter on that band.

The length formula for an end-fed aerial is:

$$\text{Length} = \frac{149.95\,(n - 0.025)}{f\,(\text{MHz})}\ \text{metres}$$

where n = number of half wavelengths.

The length we require is one which will accommodate four halfwaves on 10 metres. Taking f = 28.5 MHz then length = 149.95 (4 - .025)/28.5 = 20.91 metres. Although the wire will be a few percent too long at the lower frequencies, the reactance introduced is small enough to be cancelled by the tuner without serious detuning effects.

Having made a prudent choice of tuner and wire length, let us proceed to a practical design of this happy partnership.

DESIGNING THE L-NETWORK

The behaviour of an end-fed harmonic aerial is best understood in terms of transmission line theory. Any single wire parallel to ground forms a transmission line against ground with a characteristic impedance Zo = 138 log 2h/r where h = height of the wire above ground and r = radius of the conductor in the same units. Typically, for a wire radius of 0.6 mm and an antenna height of 7.62 metres, Zo = 607 ohms.

Such a transmission line, although physically open circuit at the far end, is in effect terminated by the equivalent of a resistance related to the power lost from the wire by radiation. As with all transmission lines, this fictitious resistance reduces as the line is lengthened in terms of wavelength and approaches infinity. For any line, this resistance is repeated at the input end and is in fact our previously mentioned Ria. Measured with a bridge, the input resistance that can be expected is shown in Table 1.

TABLE 1.

LENGTH OF WIRE WAVELENGTHS	RIA OHMS
0.25	60
0.5	2 800
1	1 700
1.5	1 200
2	900
3	750
4	700

Figure 1a depicts the basic circuit of the L-network when matched between the output load impedance of the transmitter (Zot) and the input resistance of the aerial wire (Ria). When Ria is very much greater than Zot, the equations for the circuit simplify to:

$$2\,fL = \sqrt{\text{Ria} \times \text{Zot}}$$

and

$$\frac{1}{2\,fc} = \sqrt{\text{Ria} \times \text{Zot}}$$

with which we find that inductance and capacitance to use in our tuner on each band. Select the value for Zot arbitrarily as 52 ohms and find the value of Ria from Table 1. A typical set of results is shown in Table 2. It should be borne in mind that these results may be modified in practice by:

a) stray capacitances and inductances in the tuner
b) reactance at the aerial input.

After constructing the L-network, the actual value of Zot may not be 52 ohms as planned but somewhere between 35 and 75 ohms. This is of no consequence as the loading control of the transmitter is quite capable of matching any pure resistance over such a range.

CONSTRUCTING THE L-NETWORK

Figure 3 gives the inductor dimensions and

TABLE 2.

FREQ MHz	RIA OHMS	XL or Xo OHMS	L μH	C pF
3.7	60	0	0	0
7.075	2 800	380	8.6	60
14.2	1 700	297	3.3	38
21.3	1 200	250	1.8	31
28.6	900	216	1.2	26

layout of a practical L-network for the 20.91 metre aerial. The values given for L in Table 2 have been translated into turns. Figure 4 is the circuit diagram. The RF choke is included to prevent static charges building up on the antenna wire during storms. Its reactance at the lowest frequency is about 20 times higher than the Low-Z input so it introduces no measurable loss. The switch is arranged to short out all but the required number of turns on 10, 15 and 20 metres. No connection is made to the 40 metre switch contact so that, on this band, the full coil is operative. In the 80 metre position the whole coil is shorted out to provide the direct connection as described previously.

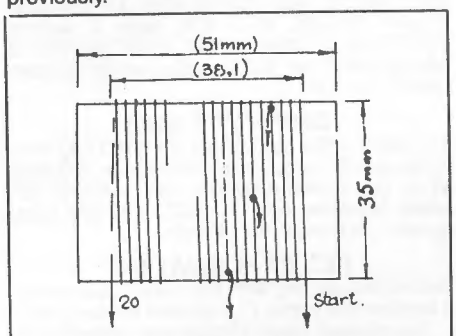

Figure 3.

5⅓	TPCM
TURNS	**BAND**
20	40
8	20
5¼	15
3½	10
Wire	**0.9mm**

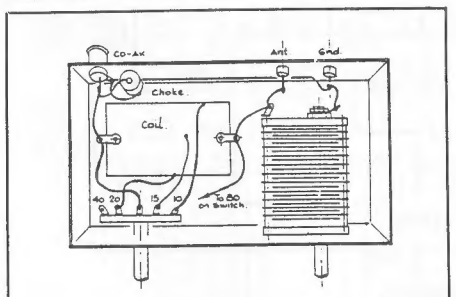

Figure 4.

The tuning capacitor has the highest voltage across it on the 40 metre band where Ria is 2 800 ohms. Using the equation Epk = 1.4 √ WR it can be seen that the capacitor must withstand a peak voltage of about 1 500 volts when the transmitter output power is 400 watts. A 0.5 mm spacing between plates is adequate, and the small capacitance permits the use of small physical size. A straight-line-wavelength type is preferable to one with circular plates as it allows greater separation between the higher frequency settings.

The whole unit was built into a plastic box measuring 127 x 77 x 51 mm. There is no need to use a metal box, but if one is used, the coil should clear the metal by at least 25 mm on all sides.

PUTTING UP THE AERIAL

The size of wire is not critical, about 1.2 mm diameter being typical. As a portion of the wire will be in the shack it is advisable to use an insulated variety. The conductor may be solid or stranded.

Take a length of wire in excess of 21 metres, and attach an aerial insulator. Anchor to some suitable point and stretch the wire a little. Accurately measure off 20.91 metres and cut.

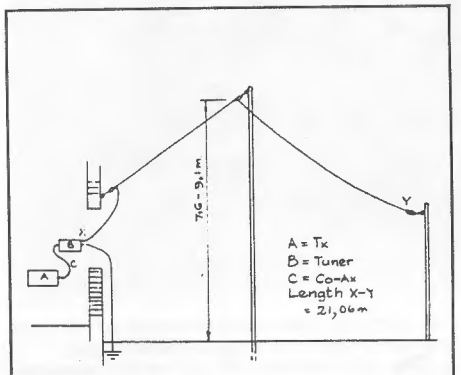

Figure 5.
A = Transmitter
B = Tuner
C = Coaxial Cable
Length X - Y = 21.06 metres

A typical installation is shown in Figure 5. Although the aerial will load and perform well in almost any configuration, I have taken the advantage of the true inverted-Vee configuration (as distinct from the drooping dipole). Reference to long wire aerials in the usual literature will show that on 10 metres this configuration, also known as a "half Rhombic," can provide low-angle, vertically polarised, end-fire radiation with a gain of some 6 dB over a ground plane antenna. The aerial tends to become more omnidirectional as the frequency is lowered but radiation on all bands tends to be greater in the direction of the free end of the wire. Even on 80 metres this diminutive aerial performs as well as a 40.23 metre length dipole at the same virtual height, provided you have an effective ground system, but of course, there is nothing to stop you from making a double size ZS6U special using the information given to modify the inductor capacitor and switching accordingly. A pole is often unnecessary if you can find something higher than your antenna, such as a chimney, to hold up the apex with nylon cord. This type of support may result in a sloping plane for the Vee, which is no disadvantage.

BEAMING TO DX

As an alternative to the inverted Vee, — if you are keen to beam your signal on 20 and 15 as well as 10, use an upward sloping configuration at an angle of about 30 degrees to the horizontal towards the desired direction. Or if you live in an apartment several storeys above ground, you can use a downward slope. For field days and temporary installations take your "box" and 21 metres of wire with you.

SECURING THE AERIAL

At the shack end of the aerial you will need an anchor to take the strain. Use nylon cord with an egg insulator, securing the wire to the latter before the last few metres drop into the shack through an air-brick, ventilator or whichever entry point you consider best. The L-network should stand close to the entry point and the transmitter should be close to the L- network so that as little coax as possible may be used to couple between the two. A length of about 600 mm is typical.

CALIBRATING THE L-NETWORK

There is only one way to positively calibrate your L-network so that it presents a pure resistance to your transmitter, and that is by means of an SWR bridge of the appropriate impedance inserted in the short piece of coax. Switch to the 40 metre band and roughly set the capacitor by peaking up on reception. Switch the SWR bridge to the reflected power position, provide a small carrier and rotate the L-network capacitor to give a minimum reflected reading. Leave it there while you load up your transmitter to full power. Now check for the minimum again and mark the scale. Repeat the procedure for 20, 15 and 10 metres. Finally, set the capacitor to minimum and switch the network to 80 metres. If it will not fully load the transmitter you have an ineffective earth system on 80 and it is time you did something about it anyway!

BAND-CHANGING

You are all set. To change bands simply switch to the band required and set the capacitor to the mark, remembering that the mark for 80 is at minimum capacitance. Once set, the tuner will provide the correct load for your transmitter tune-up and it should not be fiddled with. The SWR you measured might have been anything from 1:1 (meaning your pure resistance was the same as the bridge) to 2:1 (meaning it was either half or double the bridge resistance). No matter what the reading, ignore it if your rig loaded up nicely. However, if you have one of those rigs without a loading control, designed optimistically to work only into a 52 ohm resistive load, you might have to move the taps until you have a 1:1 ratio on a 52 ohm bridge on all bands. If you borrowed the bridge you can now return it to the owner.

CONCLUSION

At the start, I hinted that this system has certain advantages, several of which have so far emerged in the text, such as a purely resistive load and no transmission line matching problems and losses. Obviously the aerial is cheap, is smaller than other aerials that include 80 metres and is an effective harmonic suppressor. Less obvious are the advantages in reception where not only does the system provide additional front end selectivity, but sensitivity as well. The latter derives from the fact that the effective capture area of the antenna remains fairly constant over its range whereas that of a trap dipole or vertical reduces in proportion to the square of the wavelength. This accounts for the lively receiver performance, particularly at the higher frequencies. RF in the shack? As reactance is absent, a field strength meter will show no greater stray RF than with conventional antennas. This goes for BCI too.

I can take no credit for the well worn principles expounded here. But I hope that pulling my selected pair out of the hat will provide a popular alternative multibander for the greater enjoyment of our hobby.

Next month we will present a follow up article. The following article will provide a summary of this months article and will also expand some of the details.

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A SQUARE WAVE GENERATOR

Part One

Ken Kimberley VK2PY
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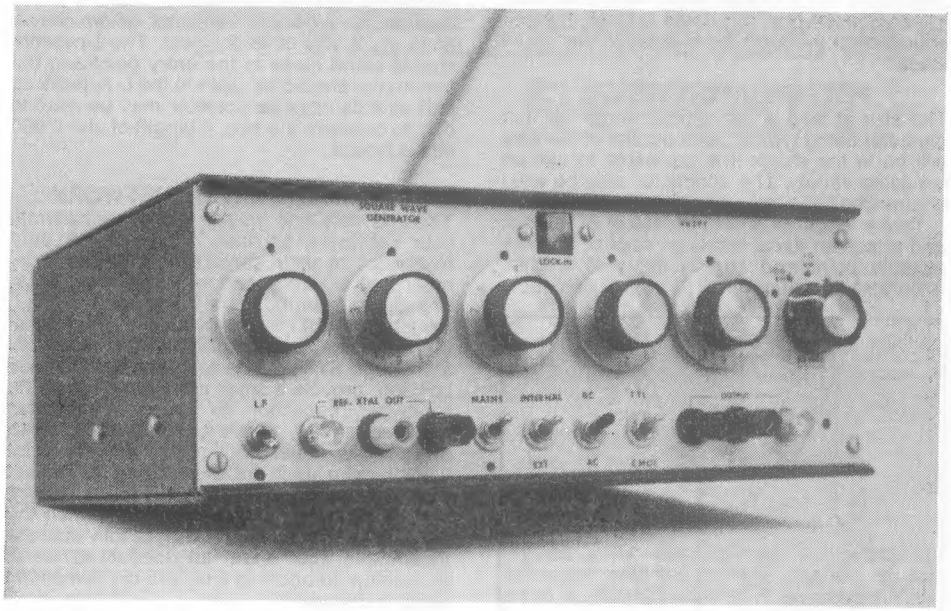

The generator about to be described uses the Phased Locked Loop (PLL) principle.

By definition and modern day vernacular, it should be called a *synthesiser* however, in the writer's opinion, this term is another of those horrible *Americanisms* which are creeping into our language, and therefore should be avoided where possible! There is certainly nothing synthetic about its performance.

This unit was originally developed having a basic frequency resolution of 1 kHz. With this configuration, the top reliable operating frequency was in the region of 3 MHz; ie 2.999 MHz.

Above here, "Lock" time increased and a small glitch of one digit appeared if and when the last two switches were set on 00. Notwithstanding, the prototype managed to stagger up to 3,800 MHz. The absolute limit being determined by the characteristic spread of the semiconductors and stray circuit capacitance.

The next version, MK II had its resolution improved by a factor of 10, enabling the output to be settable to 100 hertz resolution. This modification needed only two extra divider chips (4017) and a rotary switch, together with a little wiring around the switch, summing gate and VCO.

The reference frequency now being 50 hertz also necessitated an increase in the loop filter time constants.

Now *Murphy* dictates that "nothing can be gained for free" (not even lunches!) and that every improvement tends to introduce some adverse reaction, however slight. The main one in this case was an increase in "Lock" time. This was acceptable up to 1.9999 MHz and usable to 2.5000 MHz where our old friend, the glitch, was still evident. It is surmised that this spurious is due to timing problems in the 74C30.

At this stage, the problem has been ignored and the frequency limits re- specified as 2.999 MHz (MK I), and 2.5000 MHz for the later version. Maybe, at a later date, a second 74C30 will be tried, or the board re-wired to take a 4068 hex NAND gate, which is more readily available.

CHIP TYPE 4046

The brain of this instrument is a CMOS IC, type 4046, which contains a zener diode, RC type VCO, two phase detectors and a source follower. However, only the VCO and one comparator are used in this design.

PLL EXPLANATION

Before proceeding with the circuit description, a brief outline of this PLL system will be given.

Two divided down signals are presented to pins 3 and 14 of the 4046. One is derived from the reference source, and the other from the VCO output via the programmable divider.

These frequencies, if different, will produce a DC error signal from the comparator which, in

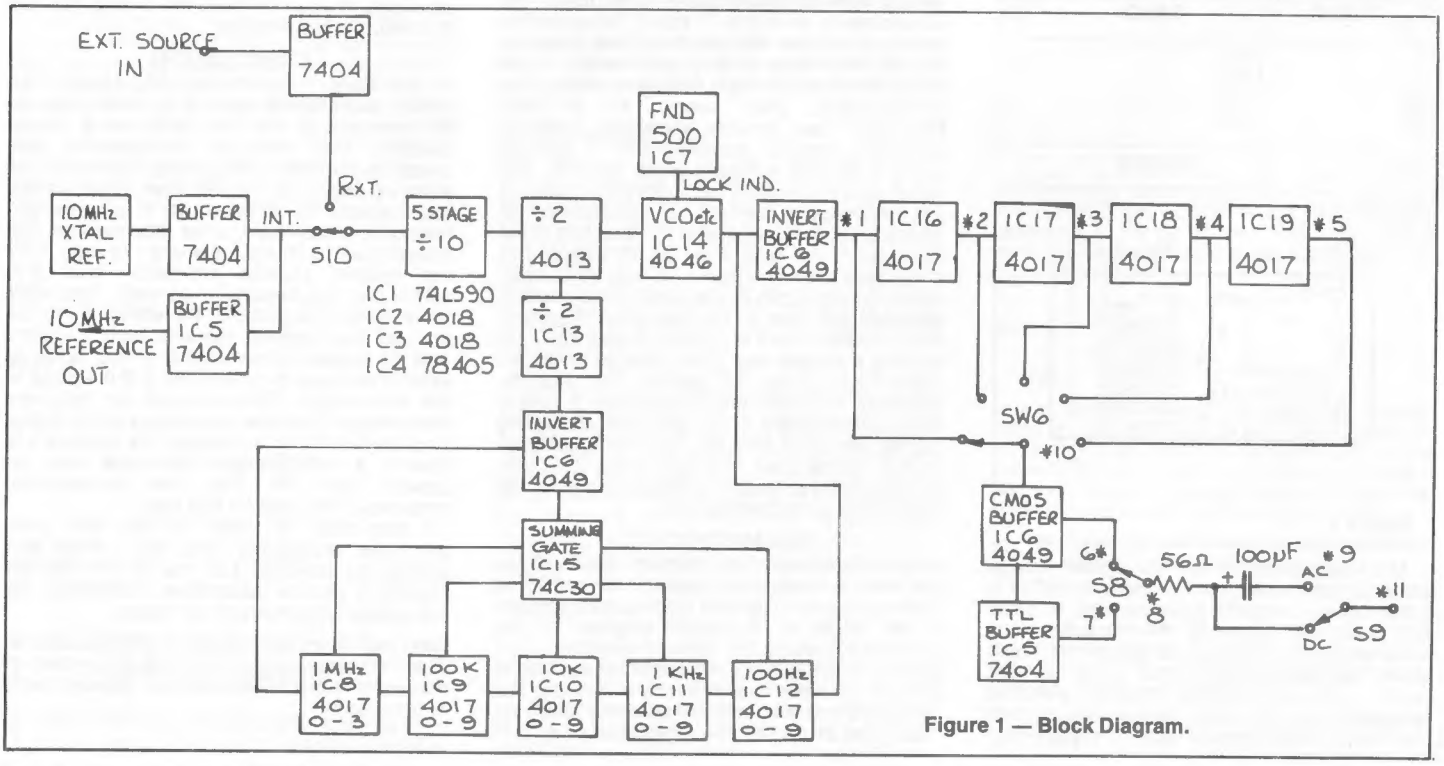

Figure 1 — Block Diagram.

turn, is fed to the VCO causing its frequency to be shifted until it locks with that of the reference.

Perhaps a practical example will make the foregoing a little clearer. Let the desired output be 1.5 MHz, therefore set the program switches to 15000. The following now takes place — Output from pin 4 of the VCO is divided by 15000 in the 4017s numbered IC8 through to IC12. The resultant is then fed, via the summing gate (IC15) 74C30, to one half of the dual "flip flop" 4013 (IC13), where a further division (2) takes place, and thence to pin 3 of the comparator. The other input (pin 14) is derived from the 10 MHz source and is supplied at 50 hertz.

The almost instantaneous reaction is for the comparator to produce an error signal which, being applied to the VCO, shifts its frequency until the signals on pins 3 and 14 are identical in frequency and phase. Therefore, the signal at pin 4 must be 30 000 times 50 Hz, or in other words, 1.5000 MHz.

Similarly, changing the program to 01000 gives a total division of 2000 resulting in a locked frequency of 100.000 kHz.

As the VCO is locked to the divided-down reference, the stability and accuracy of the two must be similar. However, a little phase noise is normally present at the VCO output. How much is dependent upon the basic VCO stability and the time constant of the "Low Pass" filter in the error signal path, and is of little consequence in this application.

GENERAL CIRCUIT DESCRIPTION

It will be easier to follow this description if reference is made to the block diagram, Figure 1.

Whilst the 4046 was said to be the brain of this circuit, the heart must certainly be the reference oscillator, for this controls the overall stability, etc. There are several ways to go in this direction, some of the alternatives being dealt with below. The final choice is governed by one's personal preference, the intended use and/or cost.

Let's look at some of them.

1. THE ULTIMATE

The constructor may choose the "Ovened Reference", which was described in an earlier paper [1]. It could be built in and a buffered output provided so that the highly stable 10 MHz source would be available for external use. This design is technically superior, but it's cost may not be justified.

2. EXCELLENT

The choice here is to build the generator minus oscillator and feed it externally from a "free-standing" ovened reference oscillator. The results will be as per Reference 1. Cost will be greater due to the duplication of power supplies, cabinets etc. Convenience would suffer a little, due to the extra connecting cables etc.

3. VERY GOOD

Forget the temperature control bit altogether and build a straight *Colpitts* oscillator using two transistors, *Darlington* configured. This design is cognisant of cost, whilst maintaining performance. It is considered that this procedure would be more than adequate for most amateurs.

4. SATISFACTORY

A gate-type crystal oscillator would perform adequately here and be quite economical as well. Suitable crystals are regularly advertised in the local magazines. Lower frequency crystals (4.000 MHz) are available and could prove very useful. One of these would enable the use of a CMOS device instead of a TTL and eliminate the level converter TR1.

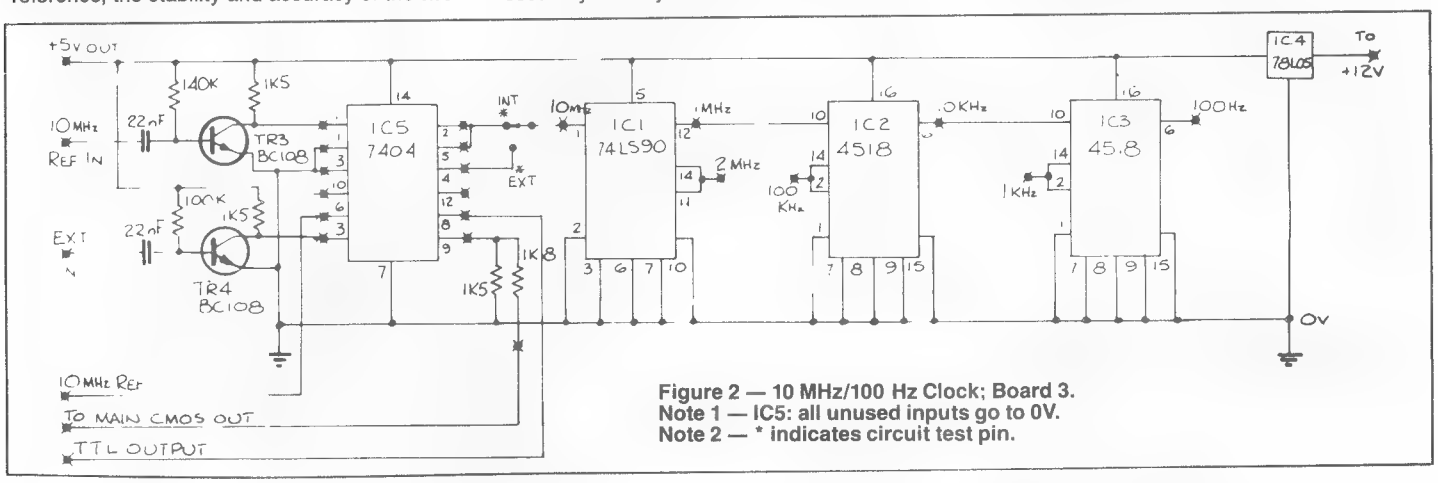

Figure 2 — 10 MHz/100 Hz Clock; Board 3.
Note 1 — IC5: all unused inputs go to 0V.
Note 2 — * indicates circuit test pin.

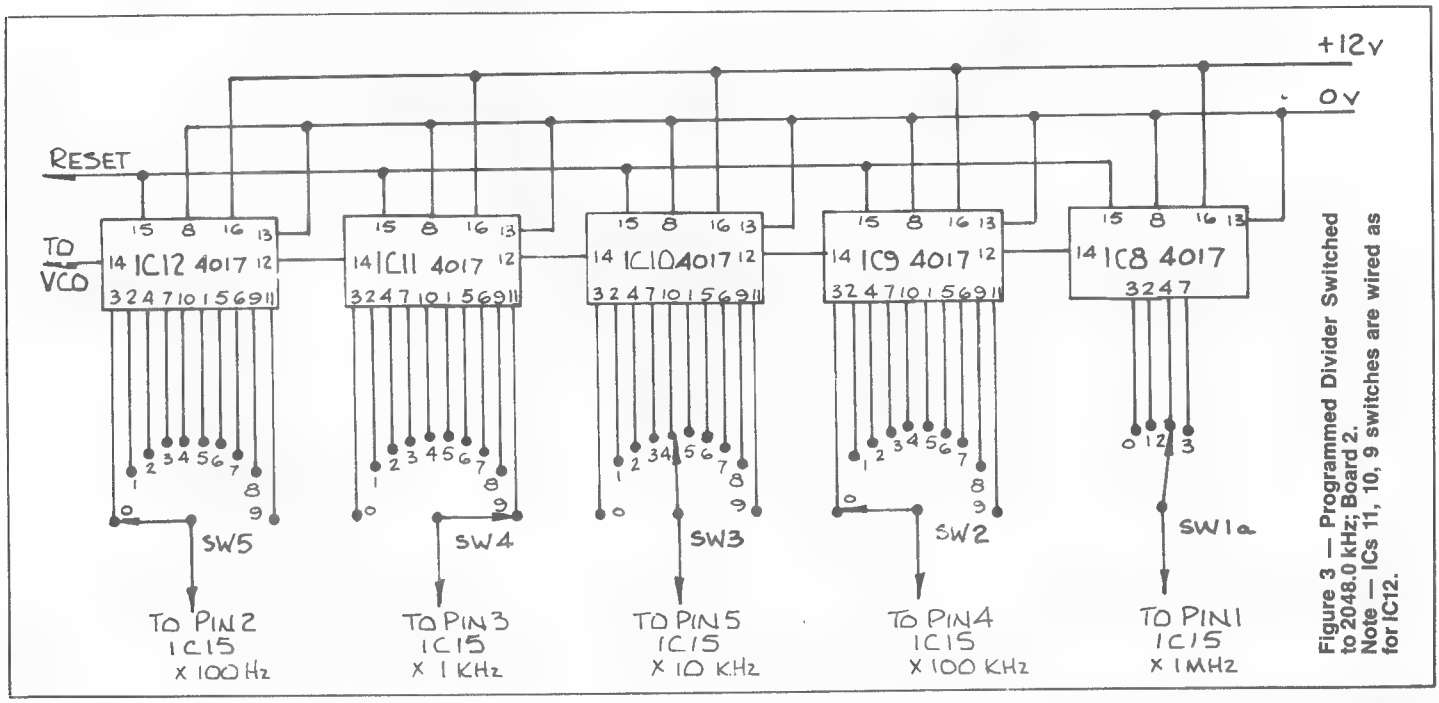

Figure 3 — Programmed Divider Switched to 2048.0 kHz; Board 2.
Note — ICs 11, 10, 9 switches are wired as for IC12.

Well readers, the choice is yours, you pay your money and get only what you pay for. Fortunately, the constructional method employed will permit a change from one to another alternative quite readily.

The author elected to use choice number one, mainly because of having already gone through the exercise of developing an "ovened oscillator." (See previous article). Hence, the remaining description is biased in this direction.

CLOCK DIVIDER

The buffered output from the reference goes, via IC5 (part 7404), to the five stage decade divider (IC1 74LS90, IC2 4518 and IC3 4518) through the internal/external switch. (See Figure 2). Thus the 10 MHz reference has become 100 Hz at 5V CMOS levels.

PROGRAMMABLE DIVIDER

Attention must now be directed to the programmable divider (see Figure 3).

This is driven from pin 4 of the 4046 (IC14). It consists of five pre-settable counters type 4017 (IC8 through to IC12) all cascaded together and controlled by five non-shorting rotary switches wired to the appropriate divider pin connectors.

SUMMING GATE

The wipers of these switches are then directed to five inputs of a Hex NAND gate (IC15 74C30), and the unused gates are held high by a 3.9 kohm resistor connected to +12 volts (See Figure 3). The output pulse is taken from pin 8 and is then presented to pin 14 (IC6 4049) of the inverting buffer. The output from pin 15 is shunted in two directions, firstly to the reset inputs of the 4017s (pin 15) and secondly to the 4013 flip flop (pin 3).

DIVIDE BY TWO

The 4013 is used to convert the asymmetrical output of the programmable divider into a square wave signal with a mark space ratio of 1:1, being divided by two at the same time. When locked, the frequency at pin 1 (IC13) will be 50 Hz (see Figure 4).

Naturally, the reference signal must also be 50 Hz, and this is taken care of by the other half of the 4013 flip flop. TR1 converts the TTL level to 12 volts CMOS so that the IC13 may be toggled.

We now have two 50 Hz signals processed and ready for the phase comparator. This section was discussed adequately in the early part of this dissertation, hence the point will not be laboured further, except to mention the lock indicator. Pin 1 of IC14 goes high in acquisition of lock, which turns TR2 hard on. The appropriate LEDs in the FND 500 display (IC7) are driven from the emitter via three current sharing resistors. The current is set at 10 mA per segment.

OUTPUT OPTIONS

A decision should now be made regarding the output options to be incorporated into the unit. (Refer Figure 1). There are many available, of which the constructor may choose any combination of those listed below:

1 Basic Range; ie frequency range from 2.5000 MHz down to 100 Hz. This is available from circuit "Test Pin" number *1.
2 259.99 kHz down to 10 Hz at pin *2.
3 25.999 kHz down to 1 Hz at pin *3.
4 2.5999 kHz down to 0.1 Hz at pin *4.
5 259.99 Hz down to 0.01 Hz at pin *5.
6 Option 1 through to 5 available at pin *10.
7 CMOS level *only* at pin *6.
8 TTL level *only* at pin *7.
9 CMOS/TTL switchable at pin *8.
10 DC coupled at pins *6, *7, *8, and *10.
11 AC coupled at pin *9.
12 AC/DC coupled at pin *11.

Options 2, 3, 4, 5, and 6 require the use of a down range extender.

DOWN RANGE EXTENDER

This section (refer Figure 5), consists of up to four decade counters (IC16 through to IC19) and are all type 4017. The exact number required depends on the range extension required.

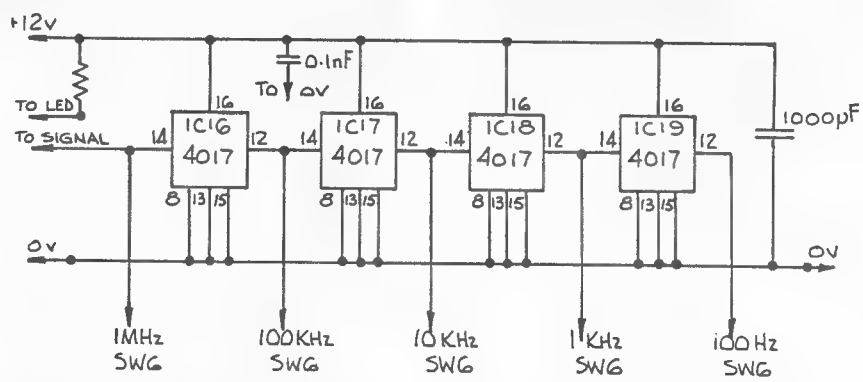

Figure 5 — Down Range Extender; Board 4.

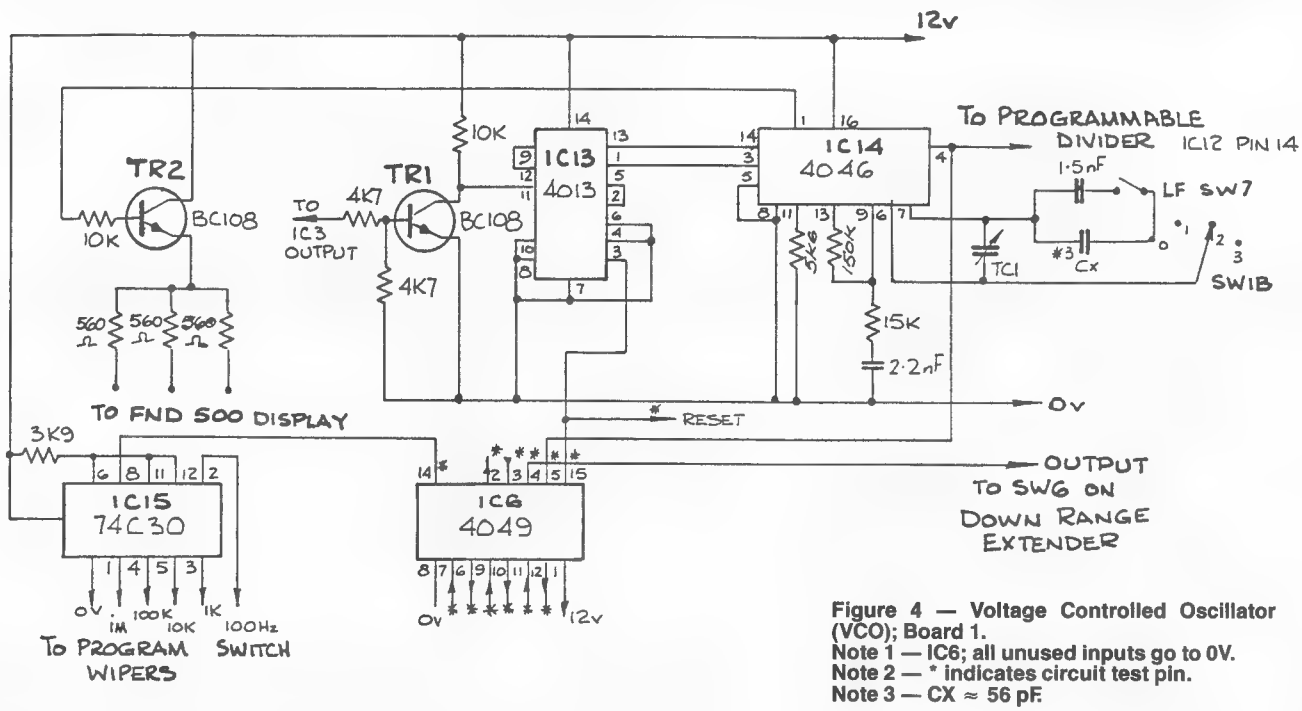

Figure 4 — Voltage Controlled Oscillator (VCO); Board 1.
Note 1 — IC6; all unused inputs go to 0V.
Note 2 — * indicates circuit test pin.
Note 3 — CX ≈ 56 pF.

If an asymmetrical output wave form is considered satisfactory, then two chips may be saved by using two only 4518 duals in lieu of the 4017s.

However, the author recommends the 4017s, and strongly suggests the fitting and wiring of all four sockets. This, plus the relevant pins, makes it a simple matter to add extra options at a later date.

Stability is assisted by the use of high values of C in the feedback path, thus reducing to a minimum, frequency shifts caused by the reaction of transistor and power supply variations, etc.

The signal is lightly coupled into TR7 which provides high gain and buffering, thence to TR8 for shaping to drive Board Three.

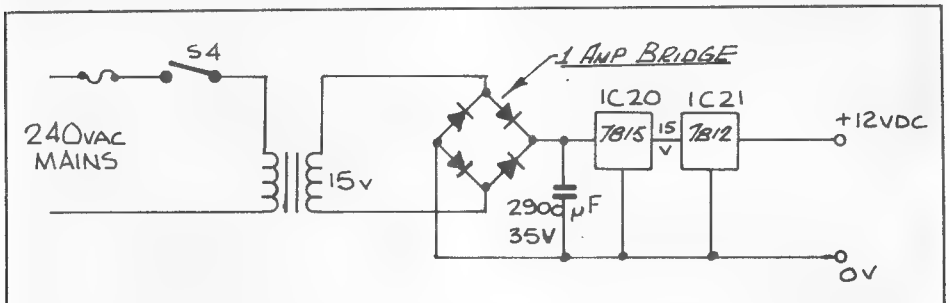

Figure 6 — Power Supply.

References: 1. 10 MHz Temperature Controlled Oscillator, AR, September and October 1986

SPECIFICATIONS

FREQUENCY RANGE AND RESOLUTION

MHz	100 Hz-2.5000 MHz in 100 Hz steps.
100 kHz	10 Hz-250.00 kHz in 10 kHz steps.
10 kHz	1 Hz-25.000 kHz in 1 Hz steps.
1 kHz	0.1 Hz-2.5000 kHz in 0.1 Hz steps.
100 Hz	0.01 Hz-250.00 Hz in 0.01 Hz steps.

OUTPUT

Switchable from TTL to 12 volts CMOS levels. Switchable from DC to AC coupled.

FREQUENCY STABILITY

Dependent on crystal oscillator used. Can be better than 0.01 PPM (per day) if using the ovened option, whilst a simple gate type will provide stabilities in the order of a few parts per million.

This completes the description of the theory of operation and the circuit of the generator. Part two of this article will describe the construction and testing of the complete unit.

To be continued . . .

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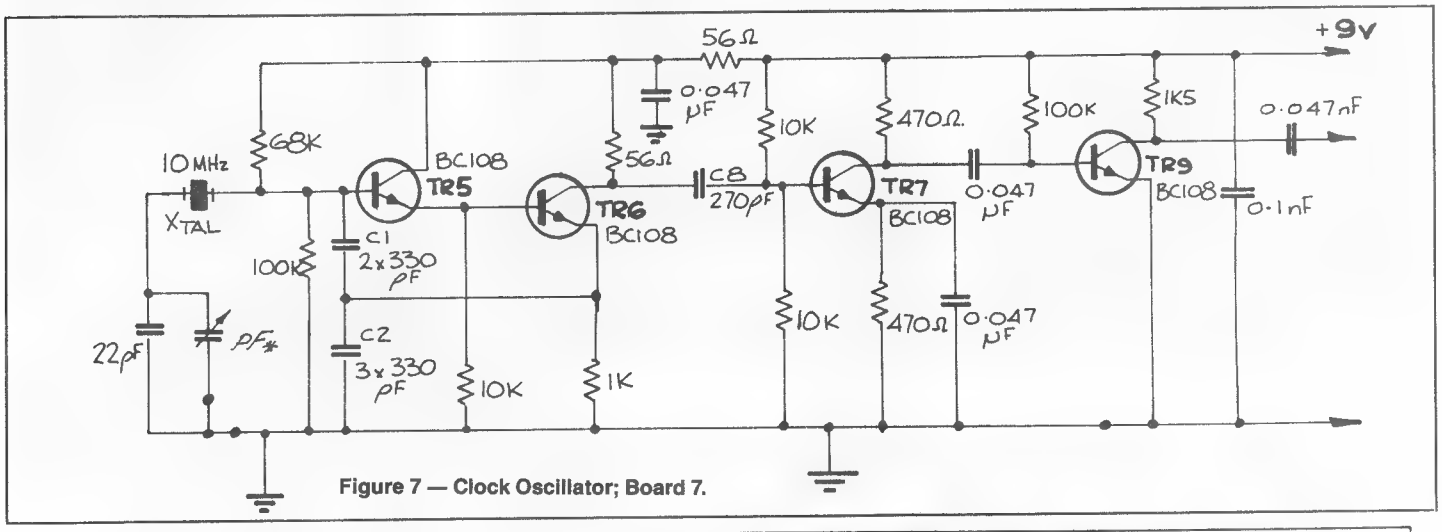

Figure 7 — Clock Oscillator; Board 7.

POWER SUPPLY

This is a comparatively simple circuit (see Figure 6), and follows convention. 240 volts "mains" supply is fed via a fuse and SPST toggle switch to a 240/15 volt power transformer (Catalogue No M2155).

Output from the 15 volt secondary is fed to a one amp bridge rectifier. Adequate filtering is provided by a 3000 uF can-type electrolytic capacitor.

Two voltage regulators are used, connected in series. The 15 volt source is derived from IC20 (7815) and the 12 volt from IC21 (7812). The two were connected in this way to improve the 12 volt regulation.

CRYSTAL CLOCK OSCILLATOR

This will be a 10 MHz crystal oscillator of some description. For those of you who have not read my previous article on crystal oscillators, or who choose to use an unovened oscillator, a brief description of a suitable type will be presented here. In fact, the unit was initially built, set up and tested using such a clock. This board is designated as number five and is built onto a "Plug-in IC Board" Catalogue No H5610. Refer Figure 7 for the circuit diagram.

It uses four type BC108s, or similar, transistors. TR5 and TR6 are used for the oscillator proper. Darlington configuration is used as better stability is obtainable with this circuit.

FLORENCE McKENZIE MEMORIAL TROPHY

Mavis and Ivor Stafford VK3KS and VK3XB
16 Byron Street, Box Hill South, Vic. 3128

In October 1983, an article,* Hamming it up on the Airwaves, *written by Jo Wiles, appeared in the magazine* New Idea. *This was a story arising from interviews with Margaret VK3DML, Mavis VK3KS and Kim VK3CYL, who had narrated to Jo their experiences in amateur radio.

So appealing did Jo make this article that some 40 interested ladies wrote to the Secretary of ALARA, Jenny Warrington VK5ANW, requesting further information as to how they could also take up the hobby. Jill Keals adopted a different course, approaching the proprietor of a radio shop in Nambour, Queensland. She was directed to inquire from a local amateur who in turn suggested that she should contact Wendy Davies VK4BSQ. This was done. Wendy offered to coach Jill for the Novice Licence and in due course Jill obtained the call sign VK4VNK.

The ALARA Contest of 1984 featured for the first time the Florence McKenzie Memorial Trophy which had been presented to ALARA by the Townsville Amateur Radio Club and which was now offered as the Award to the Australian YL novice operator gaining the highest CW score in the Contest. Jill scored 162 points and was awarded the trophy.

As the trophy is large, and forwarding it would have been very expensive, it had been decided that a certificate nearing a photograph of the trophy would be sent instead. Jill nevertheless retains the honour of being the first Australian YL novice to win the trophy and to have her name engraved on it. Thanks to further coaching from Wendy, Jill is now VK4ASK.

In 1985, unfortunately no YL novice entered for the trophy, but it is hoped that the 1986 ALARA Contest which takes place on November 8, will see a number of Australian YL novice operators competing for this magnificent award. It will be on display in the Victorian Divisional Office.

RTTY TEST GENERATOR

Peter Gibson VK3AZL
9 Coombah Court, Mooroolbark, Vic. 3138

This article describes a hardware based RTTY test generator which is capable of generating a number of pre-programmed fixed messages or a continuous stream of single characters. It can generate either ASCII or Baudot with a wide range of shifts and speeds.

INTRODUCTION

As described in a previous article, see *Amateur Radio* April 1986, I decided that I would like to be able to decode the many RTTY signals that can be heard across the HF bands.

In due course, a rather sophisticated, (an alternative description is over- complicated), decoder offering many options had been designed and was just about finished. At this point, the problem of testing it was considered. The obvious alternatives were to either use off-air signals with the attendant distortions, interference and doubt that it may not be a valid code anyway or to build a test generator that would produce a predictable output. The latter course was chosen.

CIRCUIT DESCRIPTION

The heart of the circuit is a Universal Asynchronous Receiver/Transmitter (UART for short). Only the transmitter portion is used here to convert from a parallel data input to a serial data stream output. The output data rate is determined by a variable frequency clock generator that drives the appropriate input on the UART.

The parallel data is generated either by a ROM or a group of up to eight switches. If the ROM is selected, a continuously repeating message of 64 characters is generated. This length was arbitrarily selected as being a convenient length that would contain "The quick brown fox, etc."

The ROM used is a 2716 which will store a maximum of 2048 characters. The data stored in the ROM can be arranged in a number of ways; ie either as a large number of short messages or a small number of long messages up to the capacity limit of the ROM. In my case, I have chosen a message length of 64 characters which then allows me to have a total of 32 different messages. If the switches are selected instead of the ROM, a continuous stream of characters as defined by the switch setting will be sent. Since the data path is a total of eight bits wide both ASCII data (seven bits) or Baudot (five bits) can be easily handled. Also connected across the eight data lines to the UART is an octal buffer that drives eight LEDs. The LEDs allow the data input to the UART to be monitored.

The serial data stream from the UART drives the logic input of an XR2206 function generator IC. The logic level input causes either of two timing networks to be selected, so generating one of two tones, depending on the logic state at the time.

DETAILED CIRCUIT DESCRIPTION

1. The UART

The UART is a very versatile, widely used integrated circuit which provides a programmable interface between an asynchronous serial data channel and a parallel data channel.

The transmitter section converts parallel data into a serial word which includes start bit, data, parity bits (if selected) and stop bit/s. The receiver converts a serial data stream of the same format as that being transmitted into a parallel word whilst automatically checking start bit, parity (if selected) and stop bit/s.

In addition to the parallel data bus lines, a number of control and status lines are available to monitor the state of the circuit and control it.

All UARTs of the type used in the circuit to be described are functionally interchangeable although some features, such as power supply requirements, vary. Some of the UART programmable characteristics are as follows:

- It can operate full or half duplex, transmitting and receiving simultaneously at different Baud rates.
- The word length may be five, six, seven or eight bits; parity generation/checking may be odd, even or inhibited.

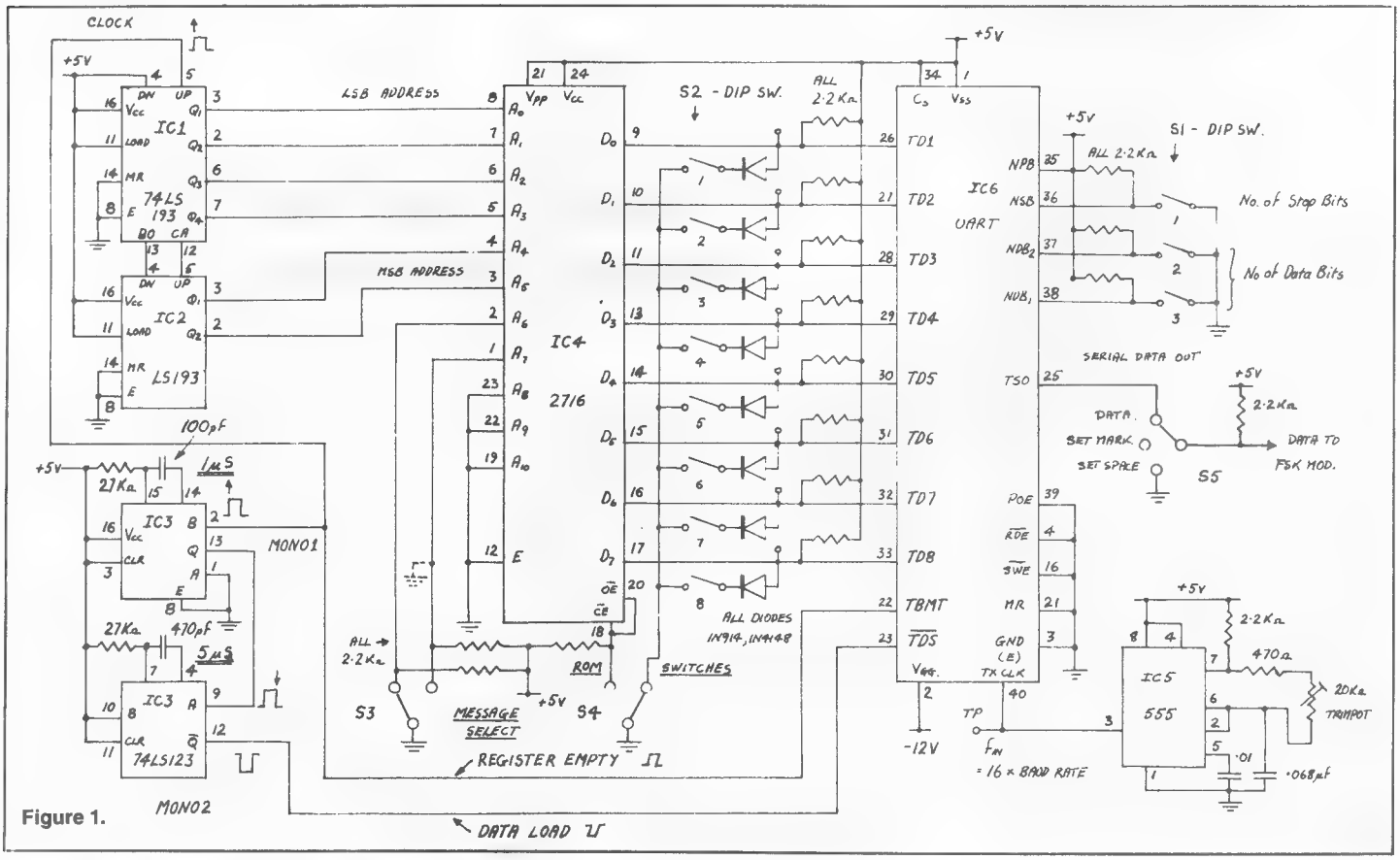

Figure 1.

● The number of stop bits may be either one or two with 1.5 bits automatically selected when transmitting five bit code.

The above description shows that the UART can form the basis of a versatile test generator that can generate a wide variety of serial data formats including the common five bit Baudot codes and seven bit ASCII, depending on the parallel data available.

2. Serial Data Generator

The serial data generator (see Figure 1), takes a parallel data word up to eight bits wide and converts it into a serial data stream at a rate determined by a variable clock generator.

Two, four bit counters (IC1 and IC2) are connected in series to form an eight bit counter of which six bits are used. This length counter generates a sequence of 64 addresses which drive the six least significant address lines (A0 to A5) of the message ROM (IC4). Address lines A6 and A7 are pulled high and connected to switch S3 which allows up to four individual 64 character messages to be selected. Address lines A8 to A10 are not used for the time being and are tied low. It can be seen that extension of the address counter length and use of the other address lines allows considerable flexibility in message length up to the total ROM capacity of 2048 characters.

The address counter is clocked by the UART transmitter buffer empty signal. This positive going signal indicates that the transmitter data buffer is empty and may be loaded with data. As well as clocking the counter, this line also clocks a one microsecond delay monostable (½ IC3). After the delay, which is to allow the new data time to settle at the UART parallel inputs, a second monostable fires. This mono provides a negative going load pulse to the "transmitter data load" input of the UART which loads the next character to be transmitted.

The data lines from the message ROM drive the parallel transmitter data inputs of the UART (IC6). Each of the data lines is connected to +5 volts through a pull-up resistor and, through a diode and switch (S2/1 to S2/8), to a common line which can be selectively grounded via switch (S4). This switch allows either the message ROM or the group of DIP switches to be selected to provide the parallel data to the UART input.

The transmitter clock oscillator (IC5) is the common 555 operating as an astable oscillator. It generates a square wave signal at a frequency of 16 times the output Baud rate, that is, at 50 Baud it is 800 Hz. The clock frequency is adjusted by a 20 kohm, 15 turn trimpot.

A set of three switches (S1/1 to S1/3) are connected to the UART to select the number of data bits and stop bits. Lines NDB1 (Pin 38) and NDB2 (Pin 37) are used to select the number of data bits needed. Line NSB (Pin 36) select the number of stop bits needed. Table 1 below sets out the options available.

TABLE 1.				
NDB1 (Pin 38)	NDB2 (Pin 37)	Bits/Char	NSB (Pin 36)	Stop Bits
L	L	5		
L	H	6	L	1
H	L	7	H	2
H	H	8		

Note that when five data bits are selected, the number of stop bits is set to 1.5 (as necessary for Baudot).

Therefore, by appropriate selection of the above switches and provision of suitable parallel data, either standard Baudot or ASCII formats may be transmitted.

Two other lines are used to select the parity options. NPB (Pin 35) selects parity on or off and POE (Pin 39) selects odd/even parity. In this case, NPB is held high thereby turning parity off.

The serial data appears on line TS0 (Pin 25). A high level corresponds to "mark" and a low level corresponds to "space." The serial data drives the logic input of the XR 2206 function generator through a three position switch (S5). This switch allows either the data line or fixed high or low logic levels to be connected to the function generator. These two fixed levels allow the mark and space frequencies to be accurately set.

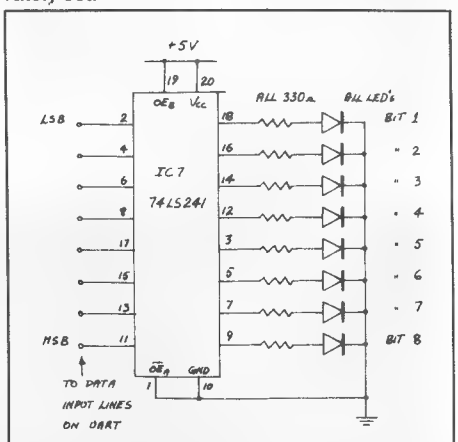

Figure 2.

3. Data Monitor

An octal buffer driving eight LEDs is used to monitor the data being sent. (See Figure 2). Each of the eight inputs to a 74LS241 octal buffer is connected to the eight data inputs to the UART. The buffer outputs drive LEDs through appropriate current limiting resistors. The LEDs in my case consisted of a LED bar display which was a way of getting the eight diodes in a convenient package. Any collection of eight LEDs will do the job.

This monitor is not absolutely necessary and falls into the "it would be nice" category. It just makes sure that the data being seen by the UART is what you think it should be.

4. FSK Oscillator

The XR2206 function generator IC is a very versatile device that has been around for many years. It is capable of generating sine, triangle and square wave signals over a wide range of frequencies. It can be amplitude modulated and, most importantly for this job, it can accept a logic input which causes either of two timing resistors to be selected. (See Figure 3). If one resistor is set to produce the mark frequency, and the other resistor to produce the space frequency, then the circuit becomes a simple FSK oscillator which produces a sine wave on either of two frequencies corresponding to the state of the input logic signal.

The timing capacitor is connected between pins five and six. The timing resistors go between pins seven or eight and ground. The relationship between these component values is simply:

$$f = \frac{1}{RC}$$

The maximum amplitude of the output signal is inversely proportional to the value of the resistor connected to pin three. For a sine wave, the amplitude is about 60 mV per k. Therefore, a value of 50 k would produce a sinusoidal signal of about six volts Peak-to-Peak.

5. EPROM Contents

As described above, this circuit has divided the ROM into a total of 32 messages each 64 characters long. For my testing purposes I

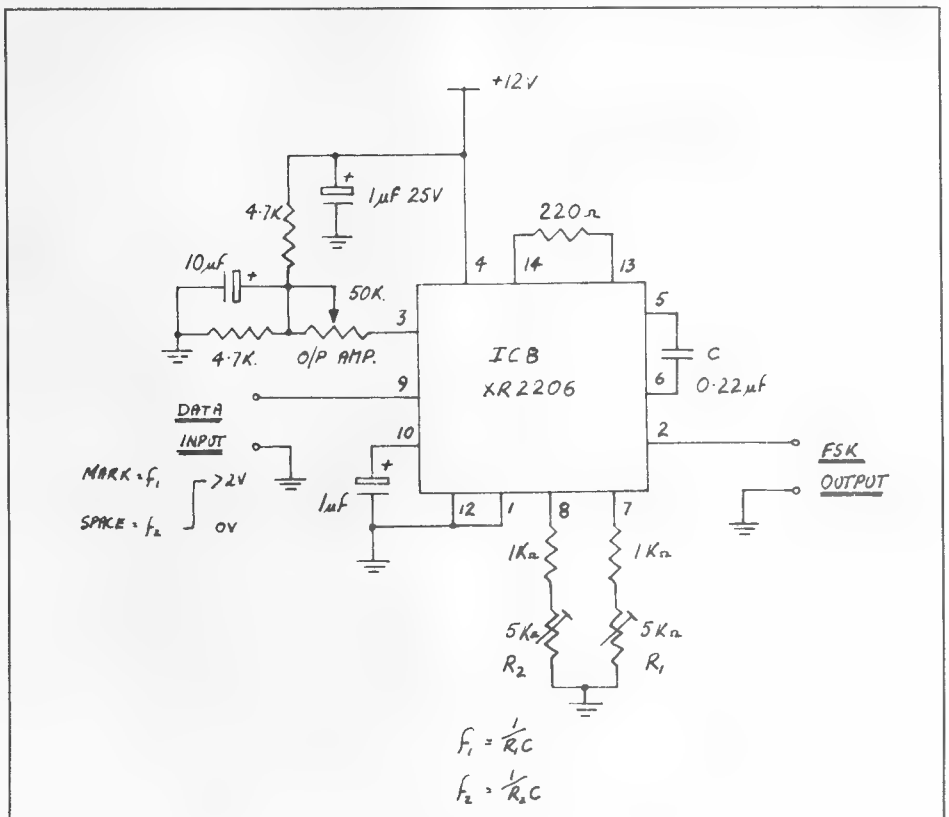

Figure 3.

have only put data into the first two message locations. The first message that extends from Hex addresses 00 to 3F produces the usual "Quick Brown Fox — etc" on one line followed by numbers 0 to 9 and some punctuation on the next. The other message consists of a line of "RYs." I figured that I could use the switches to test anything missed out with these tests. Table 2 gives the complete address/data list in Hex format for both of these messages.

TABLE 2.

MESSAGE 1			MESSAGE 2		
Character	Hex Address	Hex Data	Character	Hex Address	Hex Data
T	00	10	LF	40	02
H	01	14	CR	41	08
E	02	01	R	42	0A
SPACE	03	04	Y	43	15
Q	04	17	R	44	0A
U	05	07	Y	45	15
I	06	06	R	46	0A
C	07	0E	Y	47	15
K	08	0F	R	48	0A
SPACE	09	04	Y	49	15
B	0A	19	R	4A	0A
R	0B	0A	Y	4B	15
0	0C	18	R	4C	0A
W	0D	13	Y	4D	15
N	0E	0C	R	4E	0A
SPACE	0F	04	Y	4F	15
F	10	0D	R	50	0A
O	11	18	Y	51	15
X	12	1D	R	52	0A
SPACE	13	04	Y	53	15
J	14	0B	R	54	0A
U	15	07	Y	55	15
M	16	1C	R	56	0A
P	17	16	Y	57	15
E	18	01	R	58	0A
D	19	09	Y	59	15
SPACE	1A	04	R	5A	0A
O	1B	18	Y	5B	15
V	1C	1E	R	5C	0A
E	1D	01	Y	5D	15
R	1E	0A	R	5E	0A
SPACE	1F	04	Y	5F	15
T	20	10	R	60	0A
H	21	14	Y	61	15
E	22	01	R	62	0A
SPACE	23	04	Y	63	15
L	24	12	R	64	0A
A	25	03	Y	65	15
Z	26	11	R	66	0A
Y	27	15	Y	67	15
SPACE	28	04	R	68	0A
D	29	09	Y	69	15
O	2A	18	R	6A	0A
G	2B	1A	Y	6B	15
SPACE	2C	04	R	6C	0A
LF	2D	02	Y	6D	15
CR	2E	08	R	6E	0A
FGRS	2F	1B	Y	6F	15
0	30	16	R	70	0A
1	31	17	Y	71	15
2	32	13	R	72	0A
3	33	01	Y	73	15
4	34	0A	R	74	0A
5	35	10	Y	75	15
6	36	15	R	76	0A
7	37	07	Y	77	15
8	38	06	R	78	0A
9	39	18	Y	79	15
.	3A	1C	R	7A	0A
,	3B	0C	Y	7B	15
?	3C	19	R	7C	0A
LF	3D	02	Y	7D	15
CR	3E	08	LF	7E	02
LTRS	3F	1F	CR	7F	08

As stated previously, some re-arrangement of the circuit will allow longer messages to be generated up to the capacity limit of the ROM.

CONSTRUCTION

Because the circuit was built as a source of test signals for the decoder, no particular effort was put into the design of neat circuit boards or layouts. Figure 4 shows the form of construction and layout used. It is not a thing of beauty and that is the best side; but it does work.

As can be seen, the circuit was built on a piece of vero-board using a number of wiring techniques ranging from conventional vero-wiring, point- to-point wiring using wire wrap and ribbon cable where the addresses or data had to be moved.

COMPONENTS

There are no particularly special components used in this circuit. The counter and monos may be either 74LS series TTL or even suitable CMOS equivalent. The octal buffer should be capable of providing up to 10 mA to drive each LED. The LEDs may either be one of the bar displays or a row of conventional LEDs which ever is easier.

The switches S2 (data group) and S1 (UART program) are eight-way and four- way DIP switches respectively. They were available and took up less room than ordinary toggles. Switches S3, S4, and S5 are conventional toggles.

The ROM is a 2716 EPROM which is relatively easy to get and inexpensive. It is also relatively easy to find someone who can program and/or erase them for you if you can't do it yourself.

The UARTs come under a variety of names, depending on manufacturer. The two that I have used are the MM5303 from National and

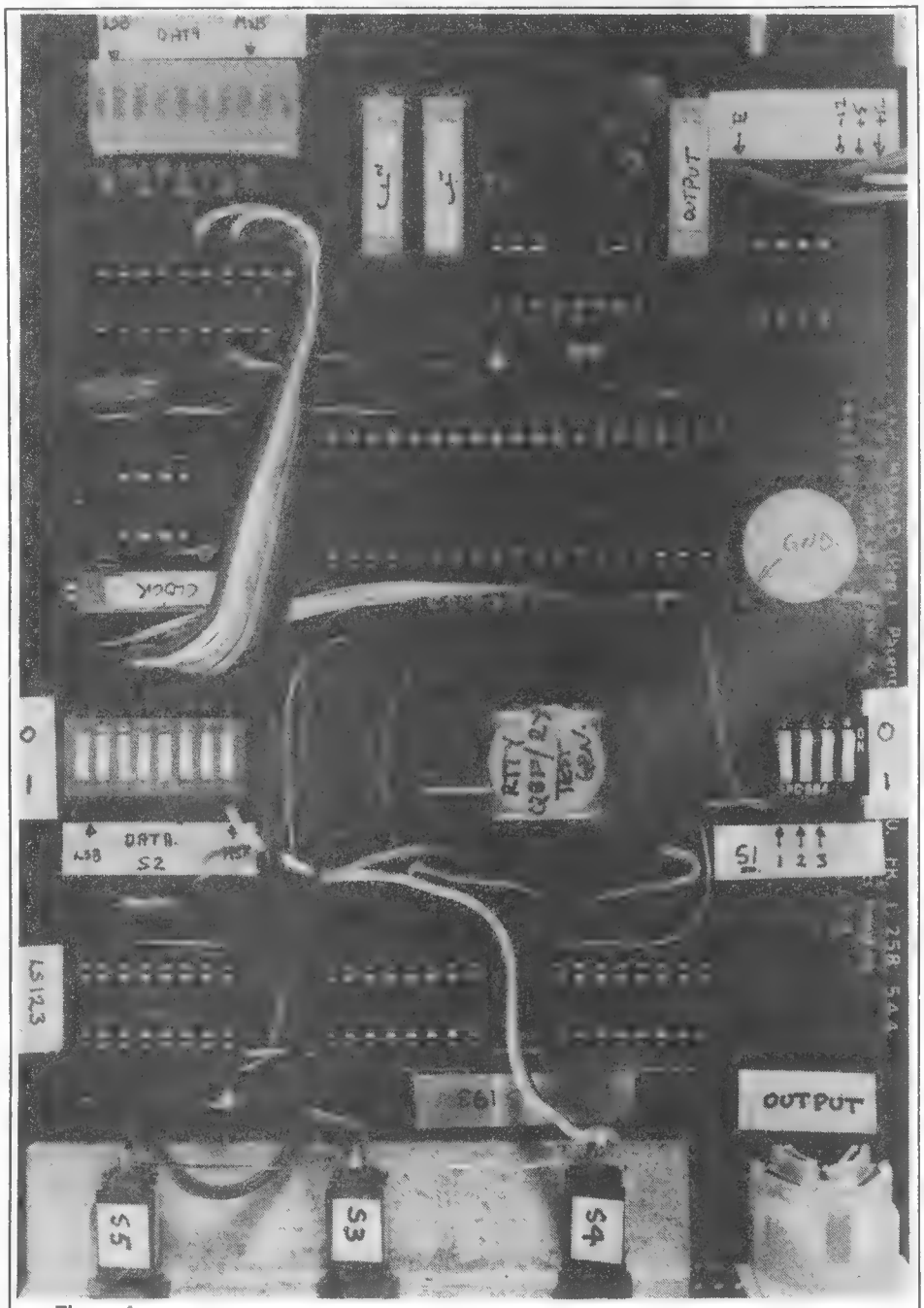

Figure 4.

the TR 1865 from Western Digital. Other similar devices are the 6402 and the AY-3-1015. One significant difference between some of these devices is in the number of power supply voltages required. All require +5 volts but some require -12 volts as well.

Note that if comparing information on different devices, quite often a given pin is identified by different abbreviated names. This is no problem since a comparison of the full data (if available) shows that the manufacturers have given the same physical function different names.

ALIGNMENT

The alignment of this circuit is quite straight forward although the use of a frequency counter is assumed.

Connect the counter to the FSK oscillator output and set S5 to "Set Space." Adjust the potentiometer connected to pin 8 for the correct space frequency. Set S5 to "Set Mark" and adjust the potentiometer connected to pin 7 for the correct mark frequency. The desired output level can be adjusted using either a meter or oscilloscope across the output. Now set S5 to "Data" for correct operation.

Transfer the counter probe to the test point connected to the UART transmit clock line (pin 40). The frequency should be precisely 16 times the desired Baud rate; ie for 50 Baud, the clock frequency should be 800 Hz.

The UART should now be configured for the wanted number of data and stop bits using switches 1, 2, and 3 of DIP switch S1 as per Table 1 in the circuit description.

The last step is to ensure that UART is properly clocking the address counter. If the data monitor is being used, switch S4 to "ROM" and watch the data change as the ROM addresses change.

Operating the message selector switch S3 will cause the message data to change although this can be a little difficult to see depending on the messages in ROM. With the two that I have, it is quite easy. Lastly, operate S4 to the "Switches" position and set up the desired code on the DIP switch S2 and ensure that the data monitor agrees with the switch code.

That completes the alignment. The unit should now be ready to use.

TIDY PACKAGE

The International Telecommunication Union has entrusted the promotion and printing of its monthly *Telecommunication Journal,* together with canvassing for and management of advertising to Horizon House-Microwave Inc, of Massachusetts, USA.

The *Telecommunication Journal* began publication in 1869, only four years after the founding of the International Telegraph Union, which in 1932 became the International Telecommunication Union. It is published in three separate editions: English, French and Spanish.

The journal reports on the work of the ITU and the evolution of telecommunications techniques and systems.

SKY CHANNEL

Australia's domestic satellite, AUSSAT, will be used for a new video and audio entertainment and information service. The service will beam material to hotels, licensed clubs and other similar outlets.

Called *Sky Channel,* and using a 30 watt AUSSAT transport, it is expected to serve 3000 three-metre dishes to be one of the largest private installations of its kind in the world.

The estimated target audience of five million people a week will see a mix of programs including major golf tournaments and other national and international sporting events, horse racing, video rock music and news.

PAPAL VISIT

The Polonia ARC, VK3CRP, was recently granted permission by DOC to use the special call sign, VI3PVA, on all amateur bands despite the novice suffix.

The special call sign was granted to commemorate the Australian visit of Pope John Paul II, this month, hence the suffix PVA — Papal Visit Australia.

The special call sign will be operational from October 1 to December 1.

A commemorative QSL card will be forwarded through the bureau to all stations that contact VI3PVA during this period.

—Contributed by Tad Dobrostanski VK3NCK

Electronics Today **November**

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AC/DC

A Program for the C64 Computer

Joseph Ortuso VK7NJO
43 Bayfield Street, Bellerive, Tas. 7018

This program performs equations for solving most AC/DC problems in the shack.

If you want to find reactance, resistance, power, frequency, etc and your head forgets the formulas, as many of us do, then this program can make life easier.

The program is very easy to use and when it is run, the first thing on the screen is a menu giving a choice of 10 options, listed from 1 to 10. After the choice has been made with the entry of a particular number, a sub-menu will display the most common equations available for that particular choice.

```
                AC/DC   M E N U

1....resistance or impedance
2....ampere
3....voltage
4....power
5....frequency
6....reactance
7....energy & q factor
8....charge & energy
9....time constant
10...transformers

enter number 1/10
```

Each of these equations are again numbered and a choice is made for the appropriate one.

At this point, it is necessary to simply answer the first and second prompt with the right value and the result will be printed at the bottom of the screen. Following is a pictorial example as all of this may sound confusing.

Suppose N.4 (POWER) is chosen from the menu, a sub-menu will appear giving a choice of five of the most common equations for POWER:

1. $P = E^2/R$
2. $P = E^2/Z$
3. $P = E \times I$
4. $P = E^2 \times R$
5. $P = I^2 \times Z$

Next, choose N.3 ($P = E \times L$). As soon as number 3 is pressed the screen will again clear and a new screen displays the equation number, together with the actual equation chosen, and asks for the first value — in this case VOLTAGE?. . .just enter 240.

Now, a second value is asked for, AMPERE. . .input .5. When the RETURN is pressed, the answer is printed: POWER = 120. . .

At the end of each equation there is a choice to continue the same sort of equations by pressing -Y- for yes or -N- for no! If -N- is chosen then you are asked if you want to -E- EXIT to the main menu or -Q- Quit the program.

Following are some explanations of how the program works:

The first two pokes in line 5 set the border and screen colour (53280,13) and (53281,3). At the moment the (x) value is set for a monochrome monitor, but this can be changed to the right value for the particular monitor in use as this is very much a matter of personal choice.

Still in line 5, the print statement sets the colour of the characters — black in this case.

(Lines 10 through 90 prints my own logo which I consider to be very much part of the program, but it can be left out if your fingers are not as nimble as mine).

The main menu begins at line 100 through to line 185.

Line 185 is the input line which waits for the input of your choice (alphanumeric).

Line 190 converts the alphanumeric string variable to a numeric one (VAL(C$)). The reason for this conversion is to create a full error-free input routine in line 195, so that if the entry is less than one or greater than 10, or is not a numeric one, the menu will remain on the screen unaltered until the right number is entered.

There has been the same error-free routine placed at each end of the sub- menu, but with a difference: instead of using the input statement as in line 185, to allow the input of your choice, this time the GET statement is used. This eliminated the need to press RETURN after making a choice and also does not give the usual flashing cursor, which can frequently be distracting.

In line 200, it can be seen that each main module starts at line 1000 with intervals of 1000, through line 10000. Line 999, with increments of 1000, has REM statements included to make program analysis easier.

From the previous example, N.4 was chosen from the main menu. Now let us examine the program from line 4000.

Line 3999 starts the beginning of the POWER module.

Line 4000 clears the screen.

Line 4005 contains two gosubs which are instructions to go to line 20041 and print whatever is in that line, and the same for gosub 20450. It may be noticed that a lot of instructions in the program are devoted purely to the cosmetic side, as I believe in not only delivering the result, but on how it is delivered.

Line 4010 through to line 4060 prints the sub-menu for POWER.

Line 4060 has another gosub, this time to line 20510.

Line 20510 prints a line dividing the sub-menu to the bottom half of the screen and it prints: ENTER NUMBER.

Line 20515 waits for the input with the GET statement.

Line 20517 converts the alphanumeric string into a numeric one only.

Line 20520 tells the computer to go back to line 4070.

Line 4070 is a very important one as it tells the computer to accept only an entry of 1 to 5 (if C1 < 1 or C1 > 5) then 4000.

Line 4080 tells the computer that, if C1 = 1 then go to 4200, if C1 = 2 then go to 4300, etc, etc.

In the example, equation N.3 was chosen from the sub-menu, so if C1 = 3 then go to 4500.

Line 4510 prints the equation chosen: P = E x L.

Line 4520 asks for the value of the voltage = E.

Line 4530 asks for the value of ampere = 1.

Line 4540 is the one that actually performs the equation: P = E x L.

Line 4550 prints P.

The routine for E x L ends the last statement in line 4560.

After P has been printed, the program jumps to line 20000 and from this line through line 20030 are the routines which give a choice to continue.

All the other modules in the program are constructed very much the same way, using higher line number increments and symmetry to enable one to augment the program with some other equations.

All of the subroutines are nested at the end of the program beginning at line 20000.

As many people still prefer the old imperial system of measuring, included in the frequency module (choice 5 from the main menu) is a routine which gives the operator a choice of finding frequency or wavelength in either feet or metres.

This program will run on any machine using Basic as long as the formatting side is kept in mind. Some computers use ∧ for eponentiation instead of ↑.

```
5 POKE53280,13:POKE53281,3:PRINT"■"
10 FORI=1TO40:PRINT"□X";:NEXT
15 FORI=1TO23:PRINT"■■X";:NEXT
20 FORI=1TO39:PRINT"■■X";:NEXT
25 FORI=1TO23:PRINT"□■X";:NEXT
30 PRINT
35 FORI=1TO36:PRINTTAB(2)"X";:NEXT
40 FORI=1TO3 :PRINT"■■X";:NEXT
45 FORI=1TO35:PRINT"■■X";:NEXT
50 FORI=1TO3 :PRINT"□■X";:NEXT
55 PRINTTAB(12)"■FOR COMMODORE 64"
60 PRINTTAB(15)"MARCH 1986"
65 PRINTTAB(1)"■■A PROGRAM GIVING EQUATIONS FOR SOLVING"
70 PRINTTAB(4)"MOST AC/DC PROBLEMS IN THE SHACK"
75 PRINTTAB(8)"■■WRITTEN BY JOSEPH ORTUSO"
80 PRINTTAB(13)"V K 7  N J O"
85 PRINTTAB(8)"■■■■PRESS SPACE TO CONTINUE"
90 GETA$:IFA$<>" "THEN90
100 REM XXXXXXXXXX MENU XXXXXXXXXXXX
110 PRINT"■";PRINTTAB(12)"□AC/DC   M E N U"
115 PRINTTAB(12)"──────────────□"
120 PRINT"■ ■1■....RESISTANCE OR IMPEDANCE"
125 PRINT"■ ■2■....AMPERE"
130 PRINT"■ ■3■....VOLTAGE"
135 PRINT"■ ■4■....POWER"
140 PRINT"■ ■5■....FREQUENCY"
145 PRINT"■ ■6■....REACTANCE"
150 PRINT"■ ■7■....ENERGY & Q FACTOR"
155 PRINT"■ ■8■....CHARGE & ENERGY"
160 PRINT"■ ■9■....TIME CONSTANT"
165 PRINT"■ ■10■...TRANSFORMERS";:GOSUB20530
185 INPUT"■ ENTER NUMBER ■1/10■ ";C$
190 LETC=VAL(C$)
195 IFC<1 OR C>10 THEN110
200 ON C GOTO 1000,2000,3000,4000,5000,6000,7000,8000,9000,10000
999 REM XXXXX RESISTANCE/IMPEDANCE XXXXX
1000 PRINT"■"
1005 GOSUB20035:GOSUB20450
1010 PRINT" ■■1...■RZ= E/I■";
1020 PRINTTAB(19)"2...■RZ= E SQR/P■"
1030 PRINT" ■3...■RZ= P/I SQR■";
1040 PRINTTAB(19)"4...■RZ= E SQR COS0/P■"
1050 PRINT" ■5...■RZ= P/I SQR COS0■"
1052 GOSUB20530
1055 PRINT" I=AMPERE...E=VOLTAGE...P=POWER";:PRINT" Z=IMPEDANCE"
1060 N$="■1-5■";:GOSUB20510
1070 IFC1<1ORC1>5THEN1000
1080 ON C1 GOTO 1200,1300,1400,1500,1600
1200 GOSUB20065
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1210 GOSUB20035:PRINT"■R= E/I■"
1220 INPUT"■■ VOLT";E
1230 INPUT"■ AMPS";I
1240 R=E/I
1250 GOSUB20035:PRINTR"OHM'S"
1260 GOSUB20000:GOSUB20470:GOTO1000
1300 GOSUB20065
1310 GOSUB20035:PRINT"■R= E↑2/P■"
1320 INPUT"■■ VOLT";E
1330 INPUT"■ POWER";P
1340 R=E↑2/P
1350 GOSUB20035:PRINTR"OHM'S"
1360 GOSUB20000:GOSUB20470:GOTO1000
1400 GOSUB20065
1410 GOSUB20035:PRINT"■R= P/I↑2■"
1420 INPUT"■■ POWER";P
1430 INPUT"■ AMPERE";I
1440 R=P/I↑2
1450 GOSUB20035:PRINTR"OHM'S"
1460 GOSUB20000:GOSUB20470:GOTO1000
1500 GOSUB20065
1510 GOSUB20035:PRINT"■Z= E↑2*COS(0)/P■"
1520 INPUT"■■ VOLT";E
1530 INPUT"■ POWER";P
1540 R=E↑2*COS(0)/P
1550 GOSUB20035:PRINTR"OHM'S"
1560 GOSUB20000:GOSUB20470:GOTO1000
1600 GOSUB20065
1610 GOSUB20035:PRINT"■Z= P/I↑2*COS(0)■"
1620 INPUT"■■ POWER";P
1630 INPUT"■ AMPS";I
1640 R=P/I↑2*COS(0)
1650 GOSUB20035:PRINTR"OHM'S"
1660 GOSUB20000:GOSUB20470:GOTO1000
1999 REM ********** AMPERE **********
2000 PRINT"■"
2005 GOSUB20037:GOSUB20450
2010 PRINT" ■■1....■I= E/R■";
2020 PRINTTAB(20)"2....■I= E/Z■"
2030 PRINT" ■3....■I= SQR RT P/R■";
2040 PRINTTAB(20)"4....■I= SQR RT P/Z■"
2045 PRINT" ■5....■I= P/E■";
2050 PRINTTAB(20)"6....■I= E/X■"
2052 GOSUB20530
2055 PRINT" R=RESISTANCE...E=VOLTAGE...P=POWER"
2057 PRINT" Z=IMPEDANCE....X=REACTANCE OHMS"
2060 N$="■1-6■":GOSUB20510
2070 IFC1<1ORC1>6THEN2000
2080 ON C1 GOTO 2200,2300,2400,2500,2600,2700
2200 GOSUB20065
2210 GOSUB20037:PRINT"■I= E/R■"
2220 INPUT"■■ VOLTS";E
2230 INPUT"■ RESISTANCE";R
2240 I=E/R
2250 GOSUB20037:PRINTI
2260 GOSUB20000:GOSUB20470:GOTO2000
2300 GOSUB20065
2310 GOSUB20037:PRINT"■I= E/Z■"
2320 INPUT"■■ VOLTS";E
2330 INPUT"■ IMPEDANCE";Z
2340 I=E/Z
2350 GOSUB20037:PRINTI
2360 GOSUB20000:GOSUB20470:GOTO2000
2400 GOSUB20065
2410 GOSUB20037:PRINT"■I= P/R↑.5■"
2420 INPUT"■■ POWER";P
2430 INPUT"■ RESISTANCE";R
2440 I=P/R
2450 PRINT"■■ ■AMPERE=■";I↑.5:PRINT
2460 GOSUB20000:GOSUB20470:GOTO2000
2500 GOSUB20065
2510 GOSUB20037:PRINT"■I= P/Z↑.5■"
2520 INPUT"■■ POWER";P
2530 INPUT"■ IMPEDANCE";Z
2540 I=P/Z
2550 PRINT"■■ ■AMPERE=■";I↑.5:PRINT
2560 GOSUB20000:GOSUB20470:GOTO2000
2600 GOSUB20065
2610 GOSUB20037:PRINT"■I= P/E■"
2620 INPUT"■■ POWER";P
2630 INPUT"■ VOLTS";E
2640 I=P/E
2650 GOSUB20037:PRINTI
2660 GOSUB20000:GOSUB20470:GOTO2000
2700 GOSUB20065
2710 GOSUB20037:PRINT"■I= E/X■"
2720 INPUT"■■ VOLT";E
2730 INPUT"■ REACTANCE";X
2740 I=E/X
2750 GOSUB20037:PRINTI
2760 GOSUB20000:GOSUB20470:GOTO2000
2999 REM ********** VOLTAGE **********
3000 PRINT"■"
3005 GOSUB20039:GOSUB20450
3010 PRINT" ■■1...■E= I*R■";
3020 PRINTTAB(20)"2...■E= SQR RT(P*R)■"
3030 PRINT" ■3...■E= P/I■";
3040 PRINTTAB(20)"4...■E= I*Z■"
3050 PRINT" ■5...■E= SQR RT(P*Z)■";
3052 PRINTTAB(20)"6...■E= I*X■"
3053 PRINT"■ 7...■E= Q/C■"
3054 GOSUB20530
3055 PRINT" I=AMPERE...R=RESISTANCE...P=POWER"
3057 PRINT" Z=IMPEDANCE....X=REACTANCE OHMS"
3058 PRINT" Q=CHARGE (COLOMB)":PRINT" C=CAPACITANCE (FARADS)
3060 N$="■1-7■":GOSUB20510
3070 IFC1<1ORC1>7THEN3000
3080 ON C1 GOTO 3200,3300,3400,3500,3600,3700,3800
3200 GOSUB20065
3210 GOSUB20039:PRINT"■E= I*R■"
3220 INPUT"■■ AMPERE";I
3230 INPUT"■ RESISTANCE";R
3240 E=I*R
3250 GOSUB20039:PRINTE
3260 GOSUB20000:GOSUB20470:GOTO3000
3300 GOSUB20065
3310 GOSUB20039:PRINT"■E= (P*R)↑.5■"
3320 INPUT"■■ POWER";P
3330 INPUT"■ RESISTANCE";R
3340 E=P*R
3350 PRINT"■■ ■VOLTAGE=■";E↑.5:PRINT
3360 GOSUB20000:GOSUB20470:GOTO3000
3400 GOSUB20065
3410 GOSUB20039:PRINT"■E= P/I■"
3420 INPUT"■■ POWER";P
3430 INPUT"■ AMPERE";I
3440 E=P/I
3450 GOSUB20039:PRINTE
3460 GOSUB20000:GOSUB20470:GOTO3000
3500 GOSUB20065
3510 GOSUB20039:PRINT"■E= I*Z■"
3520 INPUT"■■ AMPERE";I
3530 INPUT"■ IMPEDANCE";Z
3540 E=I*Z
3550 GOSUB20039:PRINTE
3560 GOSUB20000:GOSUB20470:GOTO3000
3600 GOSUB20065
3610 GOSUB20039:PRINT"■E= (P*Z)↑.5■"
3620 INPUT"■■ POWER";P
3630 INPUT"■ IMPEDANCE";Z
3640 E=P*Z
3650 PRINT"■■ ■VOLTAGE=■";E↑.5:PRINT
3660 GOSUB20000:GOSUB20470:GOTO3000
3700 GOSUB20065
3710 GOSUB20039:PRINT"■E= I*X■"
3720 INPUT"■■ AMPERE";I
3730 INPUT"■ REACTANCE";X
3740 E=I*X
3750 GOSUB20039:PRINTE
3760 GOSUB20000:GOSUB20470:GOTO3000
3800 GOSUB20065
3810 GOSUB20039:PRINT"■E= Q/C■"
3820 INPUT"■■ CHARGE (COULOMB)";Q
3830 INPUT"■ CAPACITANCE (FARADS)";C
3840 E=Q/C
3850 GOSUB20039:PRINTE"VOLTS"
3860 GOSUB20000:GOSUB20470:GOTO3000
3999 REM ********** POWER **********
4000 PRINT"■"
4005 GOSUB20041:GOSUB20450
4010 PRINT" ■■1....■P= E SQR /R■";
4020 PRINTTAB(20)"2....■P= E SQR /Z■"
4040 PRINT" ■3....■P= E*I■";
4050 PRINTTAB(20)"4....■P= I SQR *R■"
4055 PRINT" ■5....■P= I SQR *Z■"
4056 GOSUB20530
4057 PRINT" R=RESISTANCE...E=VOLTAGE...I=AMPERE"
4058 PRINT" Z=IMPEDANCE"
4060 N$="■1-5■":GOSUB20510
4070 IFC1<1ORC1>5THEN4000
4080 ON C1 GOTO 4200,4300,4500,4600,4700
4200 GOSUB20065
4210 GOSUB20041:PRINT"■P= E↑2/R■"
4220 INPUT"■■ VOLTAGE";E
4230 INPUT"■ RESISTANCE";R
4240 P=E↑2/R
4250 GOSUB20041:PRINTP
4260 GOSUB20000:GOSUB20470:GOTO4000
4300 GOSUB20065
4310 GOSUB20041:PRINT"■P= E↑2/Z■"
4320 INPUT"■■ VOLTAGE";E
4330 INPUT"■ IMPEDANCE";Z
4340 P=E↑2/Z
4350 GOSUB20041:PRINTP
4360 GOSUB20000:GOSUB20470:GOTO4000
4500 GOSUB20065
4510 GOSUB20041:PRINT"■P= E*I■"
4520 INPUT"■■ VOLTAGE";E
4530 INPUT"■ AMPERE";I
4540 P=E*I
4550 GOSUB20041:PRINTP
4560 GOSUB20000:GOSUB20470:GOTO4000
4600 GOSUB20065
4610 GOSUB20041:PRINT"■P= I↑2*R■"
4620 INPUT"■■ AMPERE";I
4630 INPUT"■ RESISTANCE";R
4640 P=I↑2*R
4650 GOSUB20041:PRINTP
4660 GOSUB20000:GOSUB20470:GOTO4000
4700 GOSUB20065
4710 GOSUB20041:PRINT"■P= I↑2*Z■"
4720 INPUT"■■ AMPERE";I
4730 INPUT"■ IMPEDANCE";Z
4740 P=I↑2*Z
4750 GOSUB20041:PRINTP
4760 GOSUB20000:GOSUB20470:GOTO4000
4999 REM ********** FREQUENCY **********
5000 PRINT"■"
5005 GOSUB20043:GOSUB20450
5010 PRINT" ■■1■....TO FIND WAVELE
5020 PRINT" ■■2■....TO FIND FREQUEN
5025 GOSUB20530
5030 PRINT" F=FREQUENCY(MHZ)...W=WA
5060 N$="■1-2■":GOSUB20510
5070 IFC1<1ORC1>2THEN5000
5080 ON C1 GOTO 5200,5300
5200 GOSUB20065
5210 GOSUB20044:PRINT"■W= V/F■"
5220 INPUT"■■ FREQUENCY.MHZ";F
5230 V=300:W=V/F
5240 V1=300/0.305:W1=V1/F
5250 GOSUB20044:PRINTW"(MT)":PRINTT
5260 GOSUB20000:GOSUB20470:GOTO5000
5300 GOSUB20065
5310 GOSUB20043:PRINT"■F= V/W■"
5315 PRINT"■■ ENTER WAVELENGTH"
5320 PRINT" (IN METERS OR FEET?)";I
5325 PRINT"■ "W$";:INPUT". WAVELENGT
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5330 IF W$="M"THENV=300:F=V/W
5340 IF W$="F"THENV=300/0.305:F=V/W
5350 GOSUB20043:PRINTF"MHZ"
5360 GOSUB20000:GOSUB20470:GOTO5000
5999 REM ********* REACTANCE ******
6000 PPINT"J"
6005 GOSUB20045:GOSUB20450
6010 PRINT" M1.....MXL=2*XFXLM"
6020 PRINT" M2.....MXC=1/2*XFXCM"
6030 PRINT" M3.....MX=E/IM"
6035 GOSUB20530
6040 PRINT" XL=INDUCTIVE REACTANCE"
6050 PRINT" XC=CAPACITIVE REACTANCE
6055 PRINT" F=FREQUENCY HERTZ";
6057 PRINT" ....X=REACTANCE OHMS"
6060 N$="M1-3M":GOSUB20510
6070 IFC1<1ORC1>3THEN6000
6080 ON C1 GOTO 6200,6300,6400
6200 GOSUB20065
6210 GOSUB20045:PRINT"MXL= 2*FXLM"
6220 INPUT"MM FREQUENCY HERTZ";F
6230 INPUT"M INDUCTANCE HENRY";L
6240 XL=2*3.*XFXL
6250 PRINT"M INDUCTIVE";PRINT" REAC
6260 GOSUB20000:GOSUB20470:GOTO6000
6300 GOSUB20065
6310 GOSUB20045:PRINT"MXC= 1/2*XFXCM
6320 INPUT"MM FREQUENCY HERTZ";F
6330 INPUT"M CAPACITANCE FARADS";C
6340 XX=2*3.XFXC:XC=1/XX
6350 PRINT"M CAPACITIVE REACT.=";XC
6360 GOSUB20000:GOSUB20470:GOTO6000
6400 GOSUB20065
6410 GOSUB20045:PRINT"MX= E/IM"
6420 INPUT"MM VOLT";E
6430 INPUT"M AMPS";I
6440 X=E I
6450 GOSUB20045:PRINTX"OHM'S"
6460 GOSUB20000:GOSUB20470:GOTO6000
6999 REM ******** ENERGY & Q **********
7000 PRINT"J"
7005 GOSUB20047:GOSUB20450
7010 PRINT" M1.1M....MW=LXI SQR /2M";
7020 REM PRINT"     M2M....M2W=LXI SQRM"
7030 PRINT"    M2M....M1=SQR RT 2W/LM"
7035 PRINT" M3M....ML=2W/I SQRM";
7040 PRINT"     M4M....MQ=XL/RM"
7042 GOSUB2530
7045 PRINT" W=ENERGY (JOULES),.L=INDUCTANCE (HENRY)"
7050 PRINT" I=CURRENT (AMPERE)"
7055 PRINT" XL=INDUCTIVE REACTANCE (OHM)";PRINT" R=RESISTANCE...Q=Q FACTOR"
7060 N$="M1-4M":GOSUB20510
7070 IFC1<1ORC1>4THEN7000
7080 ON C1 GOTO 7200,7400,7500,7600
7200 GOSUB20065
7210 GOSUB20047:PRINT"MW= LXI↑2/2M"
7220 INPUT"MM INDUCTANCE HENRY";L
7230 INPUT"M AMPERE";I
7240 W=LXI↑2/2
7250 GOSUB20047:PRINTW " JOULES"
7260 GOSUB20000:GOSUB20470:GOTO7000
7400 GOSUB20065
7410 GOSUB20047:PRINT"MI= 2W/L↑.5M"
7420 INPUT"MM JOULES";W
7430 INPUT"M INDUCTANCE";L
7440 I=2XW/L
7450 GOSUB20047:PRINTSQR(I)"AMPERE"
7460 GOSUB20000:GOSUB20470:GOTO7000
7500 GOSUB20065
7510 GOSUB20047:PRINT"ML= 2W/I ↑2M"
7520 INPUT"MM JOULES";W
7530 INPUT"M AMPERE";I
7540 L=2XW/I↑2
7550 GOSUB20047:PRINTL"HENRY"
7560 GOSUB20000:GOSUB20470:GOTO7000
7600 GOSUB20065
7610 PRINT"M MQ FACTORM";:PRINT"     MQ=XL/RM"
7620 INPUT"MM INDUCTIVE REACT.(OHM'S)";XL
7630 INPUT"M RESISTANCE";R
7640 Q=XL/R
7650 PRINT"M Q FACTOR= ";Q
7660 GOSUB20000:GOSUB20470:GOTO7000
7999 REM ****** CHARGE & ENERGY *******
8000 PRINT"J"
8005 GOSUB20050:GOSUB20450
8010 PRINT" M1....MQ=CXEM"
8020 PRINT" M2....MW=PXTM"
8030 PRINT" M3....ME=Q/CM"
8035 GOSUB2530
8040 PRINT" Q=CHARGE (COULOMBS),..E=VOLTAGE"
8045 PRINT" C=CAPACITANCE (FARAD)"
8050 PRINT" W=ENERGY IN WATT HOURS"
8055 PRINT" P=POWER IN WATTS"
8057 PRINT" T=TIME IN HOURS"
8060 N$="M1-3M":GOSUB20510
8070 IFC1<1ORC1>3THEN8000
8080 ON C1 GOTO 8200,8300,8400
8200 GOSUB20065
8210 GOSUB20050:PRINT"MQ= CXEM"
8220 INPUT"MM CAPACITANCE (FARAD)";C
8230 INPUT"M VOLTAGE";E
8240 Q=CXE
8250 GOSUB20050:PRINTQ"CHARGE (COULOMB.)"
8260 GOSUB20000:GOSUB20470:GOTO8000
8300 GOSUB20065
8310 GOSUB20050:PRINT"MW= PXTM"
8320 INPUT"MM POWER IN WATTS";P
8330 INPUT"M TIME IN HOURS";T
8340 W=PXT
8350 PRINT"M ENERGY="W"WATT HOURS"
8360 GOSUB20000:GOSUB20470:GOTO8000
8400 GOSUB20065
8410 GOSUB20050:PRINT"ME= Q/CM"
8420 INPUT"MM CHARGE (COULOMB)";Q
8430 INPUT"M CAPACITANCE (FARADS)";C
8440 E=Q/C
8450 PRINT"M VOLTAGE="E"VOLTS"
8460 GOSUB20000:GOSUB20470:GOTO8000
8999 REM ******* TIME CONSTANT ********
9000 PRINT"J"
9005 GOSUB20052:GOSUB20450
9010 PRINT" M1....MTC=L/RM"
9020 PRINT" M2....MTC=RXCM"
9025 GOSUB20530
9030 PRINT" R=RESISTANCE...L=INDUCTANCE (HENRY)"
9035 PRINT" C=CAPACITANCE (FARAD)"
9060 N$="M1-2M":GOSUB20510
9070 IFC1<1ORC1>2THEN9000
9080 ON C1 GOTO 9200,9300
9200 GOSUB20065
9210 GOSUB20052:PRINT"MTC= L/RM"
9220 INPUT"MM INDUCTANCE (HENRY)";L
9230 INPUT"M RESISTANCE";R
9240 TC=L/R
9250 GOSUB20052:PRINTTC"SECONDS"
9260 GOSUB20000:GOSUB20470:GOTO9000
9300 GOSUB20065
9310 GOSUB20052:PRINT"MTC= RXCM"
9320 INPUT"MM RESISTANCE";R
9330 INPUT"M CAPACITANCE (FARAD)";C
9340 TC=RXC
9350 GOSUB20052:PRINTTC"SECONDS"
9360 GOSUB20000:GOSUB20470:GOTO9000
9999 REM ******* TRANSFORMERS *********
10000 PRINT"J"
10005 GOSUB20055:GOSUB20450
10010 PRINT" M1....MES=EPXNM";
10020 PRINT"                2....MN=TS/TPM"
10030 PRINT" M3....MT.RATIO=SQR RT ZM";
10035 PRINT" 4..MZ.RATIO=N SQR"
10037 GOSUB20530
10040 PRINT" ES=SECONDARY VOLTAGE"
10042 PRINT" EP=PRIMARY VOLTAGE...";
10044 PRINT" N=TURN RATIO"
10046 PRINT" Z=IMPEDANCE RATIO"
10047 PRINT" TP=PRIMARY TURNS...";
10048 PRINT" TS=SECONDARY TURNS"
10060 N$="M1-4M":GOSUB20510
10070 IFC1<1ORC1>4THEN10000
10080 ON C1 GOTO 10200,10300,10400,10500
10200 GOSUB20065
10210 GOSUB20055:PRINT"ME(S)= E(P)XNM"
10220 INPUT"MM VOLTAGE (PRIMARY)";EP
10230 INPUT"M TURN RATIO";N
10240 ES=EPXN
10250 PRINT:PRINTES"VOLT (SECONDARY)"
10260 GOSUB20000:GOSUB20470:GOTO10000
10300 GOSUB20065
10310 GOSUB20055:PRINT"MN= TS/TPM"
10320 INPUT"MM TURNS (SECONDARY)";TS
10330 INPUT"M TURNS (PRIMARY)";TP
10340 N=TS/TP
10350 PRINT:PRINT" TURN RATIO OF"N
10360 GOSUB20000:GOSUB20470:GOTO10000
10400 GOSUB20065
10410 GOSUB20055:PRINT"MN= Z↑.5M"
10420 INPUT"MM IMPED.RATIO";Z
10440 N=Z↑.5
10450 PRINT:PRINT" TURNS RATIO OF"N
10460 GOSUB20000:GOSUB20470:GOTO10000
10500 GOSUB20065
10510 GOSUB20055:PRINT"MZ= N↑2M"
10520 INPUT"MM TURNS RATIO";N
10540 Z=N↑2
10550 PRINT:PRINT" IMPED.RATIO OF";Z
10560 GOSUB20000:GOSUB20470:GOTO10000
20000 GOSUB 20530
20002 PRINT"M  ANOTHER EQUATION ? MY/NM"
20003 RETURN
20005 PRINT"M  MEXIT TO MAIN MENU   OR   MQUIT"
20010 GOSUB 20515
20015 IFC$<>"E"ANDC$<>"Q"THEN20010
20020 IFC$="E"THEN RESTORE:GOTO110
20030 PRINT"J":END
20035 PRINT"M MRESISTANCE/IMPEDANCE:M ";:RETURN
20037 PRINT"M M AMPERE:M ";:RETURN
20039 PRINT"M M VOLTAGE:M ";:RETURN
20041 PRINT"M M POWER:M ";:RETURN
20043 PRINT"M M FREQUENCY:M ";:RETURN
20044 PRINT"M M WAVELENGTH:M ";:RETURN
20045 PRINT"M M REACTANCE:M ";:RETURN
20047 PRINT"M M ENERGY :M ";:RETURN
20050 PRINT"M M CHARGE & ENERGY:M ";:RETURN
20052 PRINT"M M TIME CONSTANT:M ";:RETURN
20055 PRINT"M M TRANSFORMERS:M ";:RETURN
20065 PRINT"J":PRINT"M YOUR EQUATION N."C1"IS:"
20068 RETURN
20450 PRINTTAB(20)" WHICH EQUATION"
20460 RETURN
20470 GOSUB 20515
20480 IFC$<>"Y"ANDC$<>"N"THEN20470
20490 IFC$="N"THEN20005
20500 RETURN
20510 FORI=1TO40:PRINT"-";:NEXT:PRINT"M  ENTER NUMBER "N$
20515 GETC$:IFC$=""THEN20515
20517 LETC1=VAL(C$)
20520 RETURN
20530 FORI=1TO40:PRINT"_";:NEXT
20540 RETURN
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THOUGHT FOR THE MONTH

A smile — none is so rich or mighty that they can get along without it, and none is so poor that they are not made rich by it.

UHF TELEVISION

Australian UHF television has had a recent channel re- shuffle by reducing the channel spacing from eight to seven megahertz. This has resulted in an additional seven channels. The UHF segments are divided into two halves — there is Band Four which extended from 526 to 582 MHz, Channels 28-35. There is then a gap of 21 to 603 MHz, the start of Band Five at Channel 39. It continues unbroken to 820 MHz, which is Channel 69.

It is interesting to note the highest Band Four channel — 35 — covers six of the nine megahertz of the amateur 50 cm segment. Many ATV systems refer to the operation as being on Channel 34, it is better referred to as Channel 35.

In VK1 and 2, the high power UHF systems are currently for the SBS service. There is Channel 28 in Sydney with 300 kW and Canberra has 200 kW. Newcastle SBS is on Channel 45, with 300 kW. Wollongong is on Channel 59 with 600 kW.

There are several translator networks in existence. The Kings Cross translator has five channels with 1 kW output. The channels used are 46, 49, 52, 55 and 58.

The Central Coast is to have three translator networks. The first has been established in Gosford, with the same channels as Kings Cross. To date the network has the Sydney and Newcastle commercial channels at 200 watts output. Further channels will be added later. Each Central Coast site has an eight channel capacity.

Elsewhere, there are some single translator systems to supply small regions, the channels currently being on Channel 66 and 69 with power outputs between 200 and 8 watts. The SBS has Channel 58 outlets at Goulburn, Cooma, and Tuggeranong in VK1. North Wollongong has a 2.5 kW translator for the ABC on Channel 50 and SBS on 44.

The Government has announced that future television expansion will be in the UHF region. This policy is not being accepted by some sections of the community who keep demanding VHF outlets. UHF is used extensively and in some cases, exclusively in parts of Europe.

SYDNEY

Multicultural Television Service

Service Area:

In Sydney, in and around the city within the area bounded by the Hawkesbury River to the north, the Blue Mountains to the west, and the Royal National Park to the south.

Location of the transmitter — Gore Hill

PARENT STATION	UHF FREQUENCY CHANNEL	UHF CHANNEL
SBS	526-533 MHz	28

Polarisation is horizontal. (Note: A Band IV aerial is required).

Kings Cross

Service Area:

Edgecliff, Darlinghurst, Surry Hills, Redfern, Darlington, Chippendale, East Sydney, Wooloomooloo, Kings Cross, parts of Potts Point, Rushcutters Bay, Double Bay, Kirribilli, Milson's Point and parts of Elizabeth Bay, Darling Point, Paddington, Sydney City, North Sydney, Waverton, Neutral Bay, Cremorne Point, and Clifton Gardens.

Location of Translators — on top of the Hyatt Kingsgate Hotel, Kings Cross.

PARENT STATION	UHF FREQUENCY CHANNELS	UHF CHANNEL
ABN (ABC)		
2 (VHF)	652-659 MHz	46
ATN 7 (VHF)	673-680 MHz	49
TCN 9 (VHF)	694-701 MHz	52
TEN 10 (VHF)	715-722 MHz	55
SBS 28 (UHF)	736-743 MHz	58

Polarisation is horizontal. (Note: A band V aerial is required).

DESIGNATION & FREQUENCY LIMITS OF AUSTRALIAN TELEVISION CHANNELS

CHANNEL NO	VISION CARRIER FREQUENCY — MHZ	FREQUENCY LIMITS — MHz
BAND I		
0	46.25	45-52
1	57.25	56-63
2	64.25	63-70
BAND II		
3	86.25	85-92
4	95.25	94-101
5	102.25	101-108
BAND III		
5A	138.25	137-144
6	175.25	174-181
7	182.25	181-188
8	189.25	188-195
9	196.25	195-202
10	209.25	208-215
11	216.25	215-222
BAND IV		
28	527.25	526-533
29	534.25	533-540
30	541.25	540-547
31	548.25	547-554
32	555.25	554-561
33	562.25	561-568
34	569.25	568-575
35	576.25	575-582
BAND V		
39	604.25	603-610
40	611.25	610-617
41	618.25	617-624
42	625.25	624-631
43	632.25	631-638
44	639.25	638-645
45	646.25	645-652
46	653.25	652-659
47	660.25	659-666
48	667.25	666-673
49	674.25	673-680
50	681.25	680-687
51	688.25	687-694
52	695.25	694-701
53	702.25	701-708
54	709.25	708-715
55	716.25	715-722
56	723.25	722-729
57	730.25	729-736
58	737.25	736-743
59	744.25	743-750
60	751.25	750-757
61	758.25	757-764
62	765.25	764-771
63	772.25	771-778
64	779.25	778-785
65	786.25	785-792
66	793.25	792-799
67	800.25	799-806
68	807.25	806-813
69	814.25	813-820

—Contributed by Tim Mills VK2ZTM

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Stan Roberts and Staff — VK3BSR

A MEETING WITH JACK . . .

Bob Geeves VK7KZ
28 Hamilton Street, West Hobart, Tas. 7000

I read the article about Jack Sykes in *Amateur Radio* (see July, page 49), only a matter of weeks before setting out with my wife and son for the United Kingdom. My wife said that, as Slaithwaite was in the area of Yorkshire in which we would be travelling, why didn't we take the copy of AR with us and see if we could manage to call in and show it to Jack Sykes. I thought that was a good idea.

On the day concerned, we were visiting a friend, Shaun, at Huddersfield, West Yorkshire, and asked him for directions to Slaithwaite. Shaun replied, in his Irish accent (an Irishman in Yorkshire? Well, if the Yorkshiremen can understand *each other,* they can understand an Irishman, and vice versa!), that Slaithwaite was only a short distance away, about half-an- hour's drive.

That would seem to present no problem to ordinary people, but my wife and I have a talent for getting lost in England, so we contemplated the "short drive" with some trepidation. (I have to comment here that I was driving and my wife was navigating, and I am not saying *whose* fault it was that we kept getting lost, but when you are driving you can't look at a map at the same time, can you?) . . .

Anyhow, we eventually found the road leading to Slaithwaite, and were there before we knew it. We then had to stop and ask directions of the locals. One of them told us that the town was *full* of Sykes, but when I showed him Jack's picture in AR he recognised him immediately. "Of course!", he exclaimed, "The old man in broadcasting! Lives up on hill. Bear right at corner, follow road, bear left at next corner, and go to top of hill." (They have a very economical speech in Yorkshire — why waste breath saying "the" and "a" . . .!)

We followed those instructions and found ourselves high in the Pennines in front of a sandstone house which could have featured in "All Creatures Great and Small," with a three element beam in the front. This *had* to be the house.

Mr and Mrs Sykes were thrilled that we had come all the way from Australia to show them his photo in the Australian AR.

We spent about an hour with then, and would have spent longer but it was right on dinner time and we had to get back to our hotel before dark — we can get lost quite easily in daylight without compounding matters trying to find our way about Yorkshire in darkness.

Jack is devoting much of his time to computers and programming and, as the article in AR stated, is soon to convert his garage into a computer workshop. They regularly visit the United States as they have children there, and Jack spends most of his time on air talking to amateurs in the USA. They both love cats, but have only one at the moment — a male called Jane, who was found up a tree in a bag. It could only happen in Yorkshire . . .

We were struck by the seemingly limitless energy and enthusiasm for everything that Mr and Mrs Sykes have. If we can be as full of life as they are when we are even in our 50s (they are in their 80s) we will be content.

A little tip Jack gave me concerning Morse was, that if you stick your Morse key down with *Blue—Tack* — just a small amount at each corner — it will not move around. His hasn't budged for years.

Jack gave me a short story (true) for publishing in AR. "And," he said, "I thought it was rather humorous, and shall be very peeved if your readers think otherwise."

Jack (left) shows Bob his shack. The infamous AR is in the foreground.

AN UNFORGETTABLE JOURNEY

A true story by John Lingards Sykes

I was returning to my radio school at Edinburgh after a long weekend at my Yorkshire home and I was a very worried young man. In two weeks time I would be sitting an examination in which success could mean an honourable career in the merchant navy, failure a place in a very long dole queue. Surprisingly, the *Flying Scotsman* was half empty at York and I managed to secure a compartment to myself, or so I thought, but at the very last moment a very presentable girl of my own age bounced into the compartment, swung a neat suitcase onto the rack, sat herself down in the corner seat diagonally opposite and quickly buried her head in a thick book. Not a smile, not a word: I might have been invisible. Well, if that was the way she wanted it I would have to talk to myself, in Morse, of course, tapping out my thoughts on the window pane.

Such was my state of mind that for the next 20 minutes my tapping was all about my forthcoming examination — what marks could I expect in the various subjects, which subjects I most needed to revise, what would I do if I failed? It was a melancholy exercise and my weary fingers craved a new tune. Almost of their own volition they started to beat out reflections on my fair companion. What was her name, where was she going, why couldn't I have a girl like her, would she scream or pull the emergency cord if I tried to kiss her? But the imagination, when once aroused, can take the bit between its teeth and gallop on quite out of control . . . How far it might have gone I dread to think but it came to a shuddering halt when I became aware of frantic tapping from the other end of the compartment, a rapid string of dots which I read as 'Stop I want to transmit' . . .

My arm fell to my side as though struck with paralysis. My eyes opened in horror and my face caught fire, but my ears utterly refused to close and for the next 10 minutes I was compelled to listen to Morse more searing than a branding iron. Mercifully there is a limit to the number of adjectives in the vocabulary of any properly brought up young lady and eventually there came a break sign, followed by "I do not know how you will fare in your examination but I give you eight out of ten for Morse sending, ten out of ten for imagination, twenty out of ten for cheek and zero for discretion. Now come and kiss me or I will both scream and pull the communication cord."

I am afraid it was a most unsatisfactory peck but, never mind, practice ought to bring improvement and Edinburgh was still four hours away. My self confidence returned with a rush and soon we were jabbering away like old shipmates. She was a telegraphist in the *Women's Royal Naval Service* and her Morse was better than mine.

"What is the book I thought you were reading so intently?"

"Crime and Punishment."

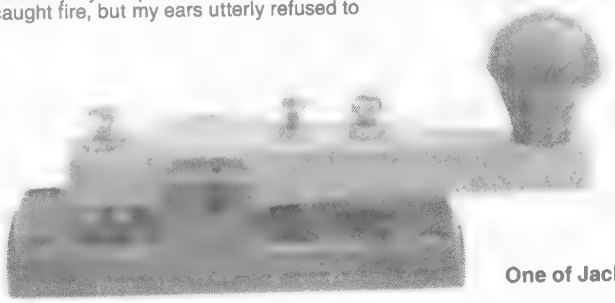
"Oh dear; have you decided on mine?"

"You are guilty of careless talk, a serious offence under the defence of the Realm Act."

"And my punishment?"

"It could be the Tower of London but I have decided to defer sentence until after your examination and until then you are remanded in my custody, but no more Morse this side of Edinburgh. Your poor finger tips must be quite sore and, anyway, I have learned quite enough about myself for one day, my giftie."

More than 50 winters and a few summers have gone by since that memorable journey but my heartbeats still tap out her name and a death watch beetle answers . . . - - - - - - - .



One of Jack's keys.

LAND AND SEA SAFARI

Introducing Dick Lee, who at the time your Editor met him, quite by chance, in Cairns towards the end of August was about to become a VK4, replacing the call P29RL which he has held for many years. Dick, who was originally VK2ZNL, is a vulcanologist by profession and has been based in Rabaul for most of his time in Papua New Guinea.

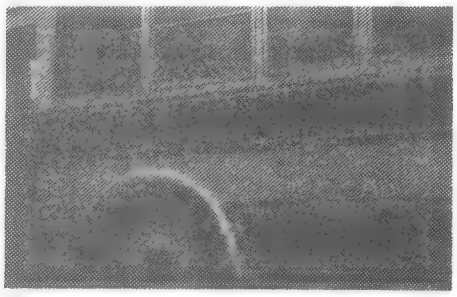
Dick and two PNG yachtsmen who are also amateurs (P29EI and P29MO) have been preparing for months to travel to Perth for the America's Cup. The two yachts (one 12 and the other 14 metres long) were scheduled to arrive in Cairns about September 18, and leave at the end of the month for VK6. Dick will set out by road at about the same time to provide a shore support facility. He and one or two companions will be travelling in the converted bus (ex Port Moresby municipal transport) shown in the photographs. Since bringing the bus to Australia with him Dick has rebuilt its interior, and it is now a luxurious mobile home as well as a multiband amateur station. The roof carries banks of solar cells for auxiliary power supply, and also a solar water-heating system to cater not only for a commodious kitchen, but also a built-in bath and shower!

The "roo-bar" is a VK4 addition.

Both amateur and marine band HF contact will be maintained with the yachts as they proceed through Torres Strait and across to Darwin. The

All aboard for VK6?

bus (fondly known as "Hanua Hound" will in the meantime travel via Townsville, Mt Isa and Tennant Creek to Darwin, where both the land and sea crews expect to remain for about a week. Probably they will have reached Darwin by the time you read this. Then, early in November, they will progress around the WA coast, with Dick maintaining contact from the highway. They expect to rendezvous several times at such places as Derby, Broome, Port Hedland, Carnarvon and Geraldton, arriving in Perth during January 1987 to join the vast array of spectator craft around the America's Cup course off Fremantle.



"Hanua Hound" on the side of the bus. (His name is yet to be added).

Frequencies to be used on the amateur bands have not been finalised at the date of writing, but probably the 80, 40 and 20 metre bands will all be used as they proceed around the Kimberley coast and head south. Both the road and sea parties will welcome QSOs with DX and VK stations generally.

Contributed by Bill Rice VK3ABP
ar

SUMMARY OF CURRENTLY LICENCED STATIONS

This summary outlines details of amateur and citizen band stations currently licensed. Stations in respect of which licenses have been due for renewal for more than three months have been excluded from the listing. Figures are for the quarter ended June 1986.

Stations operated in Australian external territories have been included with those stations operating in neighbouring States of the Australian mainland in accordance with the following listing:

Antarctica — Tasmania; Christmas and Cocos-Keeling Islands — Western Australia; Norfolk Island — New South Wales.

STATION	ACT	NSW	VIC	QLD	SA	NT	WA	TAS	TOTAL
AMATEUR									
Beacon	2	19	18	28	5	1	23	2	98
Limited	56	864	1031	369	271	26	223	104	2944
Limited/Novice	16	333	306	227	127	19	93	42	1163
Novice	52	905	764	613	331	51	219	96	3031
Unrestricted	178	2785	2458	1410	1045	77	903	345	9201
									16437
Citizen Band									
27 MHz	533	29705	31798	26988	12695	742	10617	3707	116785
UHF	186	13913	14518	16555	13949	219	7272	2312	68924
									185709
Repeater									
Amateur	2	45	50	28	12	2	13	12	164
CBRS	-	30	20	39	14	1	19	8	131
									295

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SCHEDULE OF COUNTRIES WITH WHICH AUSTRALIA HAS RECIPROCAL LICENSING ARRANGEMENTS

ADMINISTRATION	CLASS OF CERTIFICATE OR LICENCE HELD	AUSTRALIAN AMATEUR LICENCE FOR WHICH HOLDER IS ELIGIBLE	REMARKS
Canada	Advanced Amateur Certificate of Proficiency in Radio Amateur Certificate of Proficiency in Radio	Full Privilege	
France	Radio Amateur Station Licence Group D and E	Full Privilege	
	Group C	Limited	
	Group B	Novice	
India	Amateur Wireless Telegraphy Station Licence	Full Privilege	
Israel	Radio Amateur Licence Class A	Full Privilege	
	Radio Amateur Licence Class B	Limited/Novice (Combined Licence)	
	Radio Amateur Licence Class C	Novice	
Japan	First and Second Class Amateur Radio Operator Certificate	Full Privilege	
	Telephone Class Amateur Radio Operator Certificate	Limited	Telephone operation only on frequency bands above 30 MHz with 10 watts maximum power
	Telegraph Class Amateur Radio Operator Certificate	Novice	
Malaysia	Amateur Station Licence	Full Privilege	Where applicant provides acceptable evidence of having qualified in telegraphy at a speed of 12 or more words-per-minute
	Amateur Station Licence	Limited	Where no acceptable evidence of telegraphy qualifications is provided
New Zealand	General Amateur Operator's Certificate	Full Privilege	
	Limited Amateur Operator's Certificate	Limited	
	Novice Amateur Operator's Certificate	Novice	
Papua New Guinea	Amateur Licence	Full Privilege	
	Amateur Licence (Limited)	Limited	
	Novice Licence	Novice	
Poland*	Amateur Licence Kategoria (Category)		* This is a "de facto" arrangement between Poland and Australia. Polish authorities recognise Certificates issued by countries which recognise Polish qualifications, without having concluded an agreement.
	(1) Pierwsza (Class A)	Combined Novice/Limited	
	(2) Drugiej (Class B)	Limited	
Singapore	Amateur Station Licence	Full Privilege	Subject to the applicant furnishing evidence of having qualified in telegraphy at a speed of 12 or more words-per-minute
	Amateur Station Licence	Limited	Where no acceptable evidence is furnished of telegraphy qualifications
Switzerland	Amateur Radio Telegraphist's Certificate (Transmission)	Full Privilege	
United Kingdom	Amateur (Sound) Licence	Full Privilege	Pre- 1964 Licence categories A and B introduced 1964
	Amateur (Sound) Licence A	Full Privilege	
	Amateur (Sound) Licence B	Limited	
United Stated of America	Extra Class Licence	Full Privilege	
	Advanced Class Licence	Full Privilege	
	General Class Licence	Full Privilege	
	Conditional Class Licence	Full Privilege	
	Technician Class Licence	Limited/Novice	
	Novice Class Licence		Not acceptable
West Germany	Deutsche Bundespost Class B Licence	Full Privilege	
	Deutsche Bundespost Class C Licence	Limited	
	Deutsche Bundespost Class A Licence	Novice	

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INSATIABLE APPETITE

Amateur Radio is always in need of a steady supply of articles for publication, whether they be short technical tips or long technical articles; even interesting anecdotes. Whilst articles on advanced and new techniques are needed, it must not be forgotten that new amateurs and novices are always interested in good basic items which the "seasoned amateur" may class as too basic for AR. So, write-up that project that has worked for you, as *Amateur Radio* has an enormous appetite for a well-balanced and varied diet.

Preparing an article for *Amateur Radio* is very simple. Just commit your thoughts to paper as you would when explaining to a friend over the air. Manuscripts may be clearly hand-written or typed original copies (no photocopies please, as frequently the photocopier prints a blank in a crucial portion of a technical explanation or formula). Include circuit diagrams if applicable — they do not have to be ready for publication (clear sketches are adequate), as AR's draughts-people will re-draw them. Don't overlook a photograph too, but please be careful when writing captions on the back — many good photos have been damaged by heavy ball-point pen marks coming through or felt-tip pens smudging from the back of one photo to the front of another.

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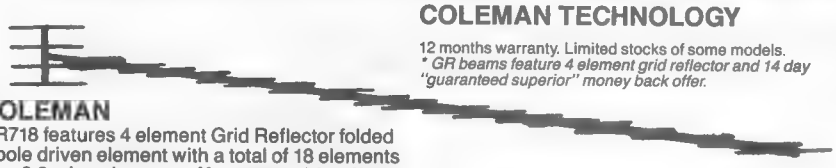

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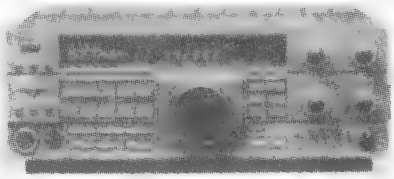

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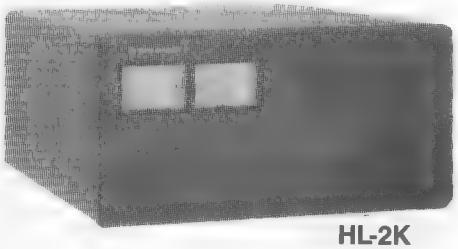

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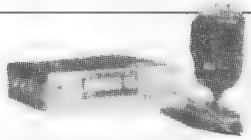

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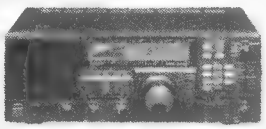

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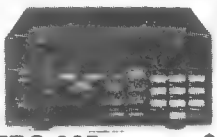

FRG-965, Inc MMB-28 **$950** ~~$1090~~
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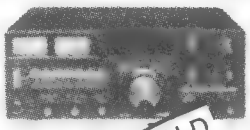

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ANOTHER RAAF OLD TIMER

Type T28 Transmitter

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To continue the historical series of articles about old-time transmitters used by the Royal Australian Air Force, this month the Air Ministry Type T28 transmitter is described.

Quoting information from Group Captain E R Hall's book, *A Saga of Achievement*, the RAAF bought two of these MF transmitters from the RAF in late-1926. After constructing new transmitting stations at Richmond and Point Cook, they came into service in 1931/32. They were rated at 1.25 kW output, but from personal experience I consider this figure to be quite conservative.

Considering the date of acquisition, this transmitter was then a quite modern device, even if its specifications and operation seem strange 60 years later. One of the unique features of this transmitter was the means used to achieve an MCW type of emission; in fact this was its only mode of operation.

This transmitter was primarily intended for use in ground-air service and it served very successfully in the service until early 1942. A subsidiary service was the transmission of weather information with regular scheds on behalf of the Meteorological Bureau. Operational ranges of 600 miles (965 km), were common but were exceeded on occasion; the limiting factor being the shorter range of the aircraft transmission systems employed.

The operating frequency was 280 kHz, but the Richmond T28 was used on occasion to work an Indian RAF station on a frequency of 190 kHz. I do not know if this was an official service or just a yen on the part of the operators concerned for a bit of MF DX! If the latter, I am sure most readers will sympathise and applaud the effort!

The motor alternator unit was a beautifully constructed and balanced piece of equipment. Its design-function was to drive from 50 Hz mains, a 400 Hz single phase alternator with a nominal output voltage of 200 volts, which supplied the primary winding of the HT transformer. From personal experience, I can state that this motor alternator averaged just over 22 minutes to run down from its full operating speed of 4000 RPM to a full-stop and that is a well balanced set of rotors in anyone's language!

Quite obviously, the operating speed of the system is determined by the motor, which is powered from the 50 Hz mains, and its speed is virtually constant. I cannot recall if the motor was synchronous, but I think it was. If we vary the field voltage of the alternator, the output voltage of the alternator can be increased or decreased from the nominal 200 volts. The frequency of 400 Hz will, however, remain constant because alternator field variations can have no effect on the 50 Hz motor speed. This then gives a means of output power control of the transmitter.

The 400 Hz 200 volt alternator output was connected to the HT transformer primary. This transformer was quoted to me as having a 100:1 voltage ratio and this would, in turn, mean a nominal transmitter HT of 20 kV. Varying the alternator output voltage as previously described would, of course, alter the HT in the same primary/secondary ratio and so give quite a large degree of power control of the transmitter output.

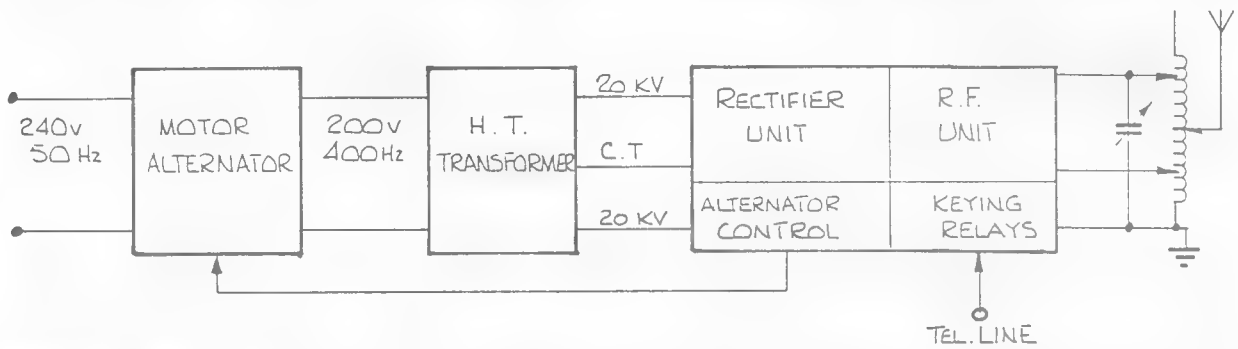
The rectifiers were "bright emitter" types of "football" valves and rheostat controls were available to set the filament currents of the valves.

The T28 transmitter at Richmond W/T Station in 1942. The HT transformer is on the right labelled "Danger."

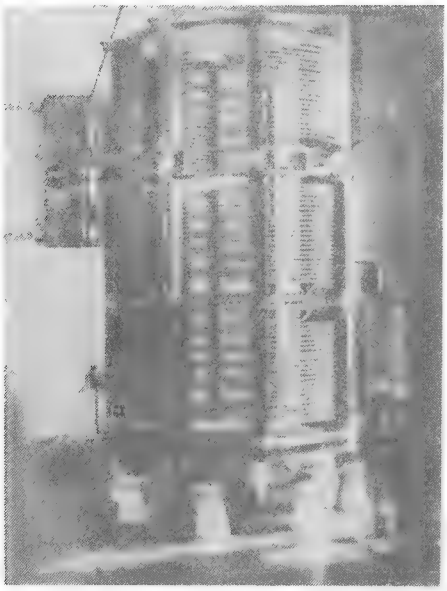
Strange to our modern ideas was the fact that *no* filtering was applied to the rectified output, so the voltage applied to the RF anodes was 800 Hz pulses from the full wave rectifiers.

The RF final consisted of two "bright emitter football" triode valves connected in parallel as an oscillator directly coupled into the aerial. These valves were again fitted with rheostat filament current controls and these could be used to balance the anode currents if necessary. As the HT was 800 Hz pulsed DC from the unfiltered rectifier unit, the transmission was obviously modulated at 800 Hz, although rather crudely.

This raw 800 Hz note gave rise to a famous nickname. This technique and the use of MCW was common in earlier days as MCW could be



Block Diagram of the Transmitter.



The antenna switch and horn gap lightning arrester on the wall.

From left: The exciter, 12 pole alternator and motor.

copied on TRF receivers and regenerative receivers that mysteriously went out of oscillation or superhets when BFOs failed.

The RF coil was wound of copper tubing and was about three feet (1 metre) in diameter and about eight feet (2 metres) high. It was large enough for a person to stand inside, but strangely, it proved impossible to find any volunteers! The aerial was directly coupled to the RF coil and was a three- cage flat top of some 500 or 600 feet (152 or 182 metres) in length and was supported from two 125 feet (38 metres) high steel towers. I cannot recall the aerial current, which was substantial, but the oscillator current was normally 160 mA. At 20 kV this was an anode input power of 3.2 kW. With a rated output of 1.25 kW this gave an efficiency of less than 40 percent, but this may be considered reasonable for an oscillator coupled directly to the aerial. I have varied the transmitter power as described and oscillation ceased at approximately 2 kW input and the transmitter was still running at an input power in excess of 5 kW. I will admit it was "kind of knocking at the knees" at this power level, however.

When I was posted to Richmond W/T Station in 1942, this old transmitter had been retired and was only on strength as a standby unit. So any running experience I had of the marque was by experimenting at times when the channel was not in use or when the transmitter was fired up if the alternative transmitter was out of service. Things were not helped by the absence of any instruction manual at that time.

When the Japanese entered WWII, it became imperative to keep airborne W/T traffic to a minimum and radio silence became almost mandatory on air-ground watches. As 280 kHz was the main air-ground channel from Richmond at that time, a procedure of sending a 15 second dash from the ground station each 10 or 15 minutes was introduced to wake aircraft operators up and enable D/F bearings to be taken from aircraft where this facility was installed.

Unfortunately, the poor old T28 just was not up to this sort of treatment, as the oscillator anodes would quickly blush, go white hot and then glisten as they were on the verge of melting. Therefore, a newer type of transmitter was used for this service and the poor old veteran was held as a standby at much reduced ratings.

Finally, after many successful years of service, the raucous notes of the T28 faded from the service scene.

ar

Try This!

CAN'T HEAR THE MONITOR?

Eric Smith VK3CES
Fairy Dell Road, Monbulk, Vic. 3793

Tests made with operators on the* Early Bird Net *have shown this idea to be effective.

Owners of the Yaesu FT-7 (and other similar rigs), when operating CW, cannot hear the monitor when the key is closed in the receive mode. Pressing the key turns on the transmitter in a type of fixed and unalterable VOX situation.

This makes it difficult to net accurately and, in net operation in particular, can be a source of frustration and nuisance.

The solution is simple. A buzzer, pitch-pipe, oscillator or any other device which can be accurately tuned to the same note as the rig's monitor (usually in the vicinity of 700 to 800 Hz) is all that is necessary.

When a station is heard, the oscillator, or whatever, is switched on and the incoming signal is then tuned to unison with the oscillator note. When the key is depressed it will be found that the rig is "netted."

Accuracy depends on the ability of the operator to produce unisons, firstly in setting the oscillator frequency and secondly in matching the incoming signal to the oscillator note.

Desirable features in an oscillator used for this purpose would be firstly a fixed frequency (pitch) and a volume control so that weak signals would not be swamped.

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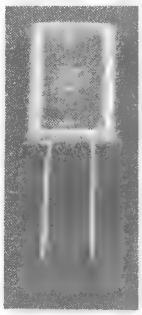
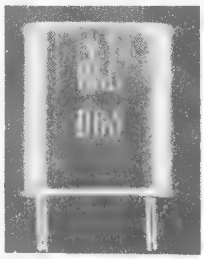


Replaces HC18/U — **HC/49u**



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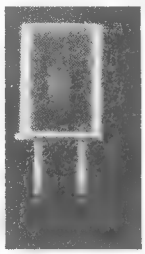
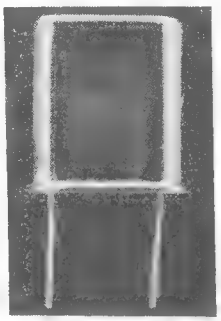


HC6/U — **HC/48u**



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PRECISE TIME COMPARISONS

For over 15 years the ABC terrestrial television network has been used with outstanding success for precise time comparisons in Eastern and Central Australia. This has enabled clocks and frequency standards to be compared with each other with submicrosecond accuracy and better than 100 nanosecond precision on a daily basis.

The method has depended on the television synchronising pulses originating from the ABC Gore Hill (Sydney) studio which were transmitted over stable terrestrial bearers to cities and towns around Australia — users measured the time of arrival of a particular sync pulse according to their own clocks, and exchanged measurements amongst themselves to determine the relative phases of the clocks.

Delays in the bearers were calibrated occasionally by carrying a portable caesium standard between users to establish relationships between the clocks directly.

In May 1986, this technique ceased to be viable in general between cities and towns because of the progressive introduction of *FEDLOCK* frame store at local television transmitters, which puts arbitrary variable delays into the total network, and because of the use of *AUSSAT* to transfer programs to local stations.

A composite system is now being introduced, using the Global Positioning System (GPS) of satellites for comparisons between a few major laboratories, ABC television from *AUSSAT* to link with other places in the South- East beam, and local terrestrial television within cities.

Initially, this system will link clocks within *AUSSAT's* South- Eastern footprint, while full national coverage may eventuate using the national beam.

GPS receivers have been in use since July 1983 to give daily comparisons of the clocks linked by television against the Master Clock at the US Naval Observatory (USNO) in Washington, DC.

As a result, a selection of Australian clocks have been, since mid-1984, contributing to the formation of Co-ordinated Universal Time (UTC) by the Bureau International de l'Heure (BIH) in Paris.

NEW TIME SCHEDULE

From May 19, 1986, the time for taking television measurements changed. The new schedule is:

TIME (UT)	SIGNAL MEASURED
0^h00^m	ABC from AUSSAT
0^h01^m	ABC terrestrial
0^h02^m	Channel 9 terrestrial

These times are in Universal Time (GMT) and correspond to 10 am Australian Eastern Standard Time, or 11 am Australian Eastern Daylight Saving Time.

The schedule change was decided upon by the National Standards Commission (NSC) Working Group on Precise Time Comparisons, and takes advantage of the changes in the television method to bring the schedule into line with standard international practice.

TERRESTRIAL TELEVISION

Within cities and areas served by a common television transmitter local television will continue to be used. The terrestrial ABC television links between Melbourne and towns in Victoria and Tasmania are expected to remain, and Telecom Australia Research Laboratories in Melbourne plan to invoke the terrestrial SBS network for a link to Adelaide. Channel 9 may also continue to be used for some time yet. This enables all clocks in the city to join the Australian time network if there is also a GPS or AUSSAT receiver in the same locality.

AUSSAT TELEVISION

The first Australian national domestic satellite is now broadcasting television programs continuously to each footprint, and HACBSS receive-only earth stations with 1.5 metre antenna are readily available commercially.

Experiments at CSIRO National Measurements Laboratory (NML) in Sydney using a 1.8 metre antenna on the South-East beam, 180 degrees K low noise amplifier, commercial B-MAC decoder and the 'traditional' television sync pulse selector have demonstrated ease of operation and insignificant jitter in time-interval measurements. The daily pattern of range variations due to the satellite's orbital characteristics is readily observed.

Similar experiments at Natmap's Orroral observatory using an all-commercial 1.5 metre earth station have confirmed the NML findings.

NML will monitor the daily range variations between the satellite and the NML antenna, and simultaneously do traditional terrestrial measurements on the Gore Hill transmissions. For earth stations at remote known locations within the SE footprint, 2-5 microseconds accuracy time comparisons can be achieved provided the satellite remains within its specified orbital bounds.

Within a few months, it is expected that several of the places with GPS receivers will also be equipped with AUSSAT earth stations. Normal measurements of the time of arrival of a common television sync pulse from AUSSAT at these 'base stations' will enable calculations of the satellite's position with sufficient accuracy to achieve time comparisons to other stations at known locations which are equipped only with a clock and a commercial HACBSS receive-only earth station.

Given four GPS/AUSSAT stations equally spaced around the perimeter of a region; eg South-East beam footprint, and with calibration of receiver delays, time transfer accuracy within the region would be limited by measurement jitter and differential propagation media effects. Even with non-optimum configurations, 100 nanosecond accuracy generally is anticipated. It is planned to establish a service which will be available anywhere within the region.

GLOBAL POSITIONING SYSTEM (GPS)

At present there are seven useful GPS space vehicles in 12-hour orbits, and time comparisons against the USNO Master Clock can be made several times daily with accuracy approaching 50 nanoseconds from almost anywhere in the world.

When the full constellation is available, by about 1990, its 18 satellites will provide virtually continuous coverage anywhere. Preliminary results are given in real time and it has proven extremely reliable so far.

The NSC Working Group recommended in 1985 that comparisons be made using GPS wherever possible.

At present, units are known to be operating in Sydney, Melbourne, ACT (2), Alice Springs, Yarragadee WA, and possibly Adelaide. However, commercial receivers ("Time Transfer Units") cost over $A30 000, a price difficult to justify by many users of precise time.

Hence, the current network consists of high precision common-view GPS time transfer links between Sydney, Canberra and Melbourne, and local television comparisons within these cities.

The use of AUSSAT is designed to extend this network, at moderate cost.

DATA CO-ORDINATION

Daily television measurements made at NML, Telecom, and the Division of National Mapping (Natmap) are sent to users on a weekly basis to enable the effects of television transmission time and propagation delay to be removed from the users' readings. Also, all interested users send their television and GPS measurements to Natmap.

These are used to form the 'mean time scale' Co-ordinated Universal Time in Australia (UTC(AUS)) which provides a common reference and relates individual clocks to international time scales. The time scale results are published each month. Natmap is making provisions to incorporate AUSSAT television measurements into the time scale and to calculate the effects of AUSSAT's range variations.

FUTURE IMPROVEMENTS

The national beam holds promise for providing a truly national time comparison service. The principal problems to be studied are antenna size needed, geographical distribution of base stations and propagation media effects.

The methods described above require exchange of information between users and a certain amount of post-processing to obtain final results. NML is looking at possibilities for impressing a timing signal on AUSSAT transmissions in such a way that the signal is 'on time' at a defined location. This would provide an adequate 'real time' service for many users within the satellite footprint.

Exchange of data is at present accomplished by letter, telex and the GE Mark III Time-share system.

The growth of digital data services provided by Telecom, AUSSAT and others should lead to improvements in speed, efficiency and availability. The Working Group is studying these with a view to recommending an inexpensive method.

APPLICATIONS

The changes to the schedule and the introduction of new methods of precise time comparison are responses to the needs, largely by standards and calibration laboratories and astronomical observatories, to maintain precise standards of time and frequency and to ensure the accuracy of their relationships to international time scales and the SI second.

These needs were clearly demonstrated at the IREE Conference on Precise Time and Frequency in Canberra in August 1980, and at the NSC Technical Workshop on Precise Time Comparisons in Sydney in February 1984. The services now in place and under development will provide adequate timing references, conveniently and at low cost, to users in South-East Australia and, shortly, in the whole country and even beyond.

Special interest in such a system has been shown by electricity authorities, geodetic surveying organisations, exploration companies and the digital communications industry. It is believed that all these and many more will benefit from the services provided.

Acknowledgments

The users are most appreciative of special arrangements made by the ABC during the FEDLOCK phase-in over the last two years. AUSSAT Pty Ltd has provided much useful information.

For further information or suggestions please contact:

Mr I K Harvey, CSIRO National Measurements Laboratory, PO Box 218, Lindfield, NSW. 2070 (02) 467 6724.

Dr L McK Luck, Division of National Mapping, PO Box 31, Belconnen, ACT. 2626 (062) 52 5172 or 35 7285.

Mr R W Harris, Telecom Australia Research Laboratories, PO Box 249, Clayton, Vic. 3168 (03) 541 5124.

Dr G Harvey, National Standards Commission, PO Box 282, North Ryde, NSW. 2113 (02) 888 3922.

—Reprinted courtesy *IREE Monitor*, August 1986 from a paper from the National Standards Commission

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SECOND ADELAIDE SCOUTS, VK5BPA & AMATEUR RADIO

Peter Koen
Secretary
2nd Adelaide Scout Amateur Radio Club
27 Hoskin Avenue, Kidman Park, SA. 5025

A diary of the growth of a radio club and JOTA, with the co-operation of friendly amateurs.

Bob VK5ADR, Club Leader, with the 2nd Adelaide Cub Scouts and Scouts and 1st Torrens Park Brownies and Guides. From left: Sonja, Jane Melanie, Katrina, David (with mic), Nick, Adam and Tony.

Our first Jamboree on the Air (JOTA) was in 1979. With the help of Mike Hart VK5NNN (Mike now lives in VK3 with fishing his number one interest) and Bob Murphy VK5MM, who helped tune the first antenna — an inverted Vee dipole. Seven contacts were made and 25 Scouts, Leaders and Parents visited the shack.

1980 was a BIG year. In May, Bob Dodd passed the NAOCP examinations and received the call sign VK5NFU. July saw the arrival and erection of a rural- type windmill tower from Dennis Myers. This tower then supported inverted Vee antennas for 80, 40, 15 and 10 metres and a two metre J-pole.

Amateur station VK5BPA was granted a licence on July 31, with Bob VK5NFU as Club Leader. August 20, the Club purchased an FTDX 401, and on October 13, it became affiliated with the WIA (SA) Division. During November, Bob upgraded from VK5NFU to VK5ADR and December 5, saw the first monthly meeting of the Club with Bob the only attendee. (Attendances improved with 12 present for one meeting!). Definitely a memorable year.

For JOTA 1980, 89 people visited the shack, including the Club's own Scouts, and two Brownie Packs. It was a time that will be long remembered as the JOTA when the shack was filled with Brownies and there was no one on air for them to talk to!

The shack was a meeting room in the Scout Hall with a special desk and notice board for the few QSL cards which were received. That JOTA would not have been possible without the help of Mike VK5NNN/ZMH, Rod VK5AN, Leith VK5QH and Les VK5ZW, all of whom donated their time, enthusiasm and expertise for the weekend.

On September 13, 1981 a home-brew antenna, faithfully constructed by Bob VK5ADR, was mounted on the tower and Les VK5ZW, loaned his rotator for JOTA 1981.

Early 1982, saw the purchase of two, two metre rigs and the removal of an ex-Telecom RAX hut to the rear of the Scout Hall. For JOTA 1982, Rod VK5AN set-up a RTTY station as well as the usual communications equipment.

The first meeting in the new shack was held on July 2, 1983 with Don McDonald VK5ADD, Assistant Commissioner for Scout Radio Activities, Adrian Snell VK5ZSN, and some Scouts present. During December a two metre RTTY modem and Model 100 were put into service.

On October 10, 1984 an 11.5 metre (38 foot) pole was erected next to the shack to accommodate ATV, UHF and two five-eighth two metre antennas. Thanks to Rod VK5AN, Don VK5ADD and Craig VK5ZAW for their assistance with this project. (A dipole antenna was later also transferred to the pole).

On May 17, 1985 the Club were honoured to use the WIA 75th Anniversary call sign, VK75A. In August, the Scout Patrols built a flashing LED project and in October the Club bought a three-element beam. Bob VK5AZ donated a rotator and Colin VK5KCR a teletype terminal. Adrian VK5ZSN, later donated a CRO for the RTTY.

Since the Club's first participation in JOTA, 317 young people have taken part and an enjoyable time was also spent during JOTA this year.

The Club has operated from many portable locations since its inception, usually where member Scouts are camped. The Club has also been involved in many activities with the WIA (SA) Division during South Australia's 150th Anniversary.

Club activities involve many nights in the shack with the member Scouts and Guides as well as visiting Scouts and Guides from neighbouring districts. Each year the Club participates in the John Moyle Memorial Field Day and the Remembrance Day Contests

The next electronics project planned for the Scouts is the construction of a CW oscillator.

Planning is well under way for VK5BP, the South Australian Scout Association station, to be on air for the 10th Australian (world invitational) Rover Moot which will be held at Woodhouse, Stirling in the Adelaide Hills from December 28, 1986 to January 8, 1987.

The 15th Australian Jamboree will be held at Woodhouse during Christmas/New Year, 1988-89, and planning has commenced for VK5BP to be operational at the site.

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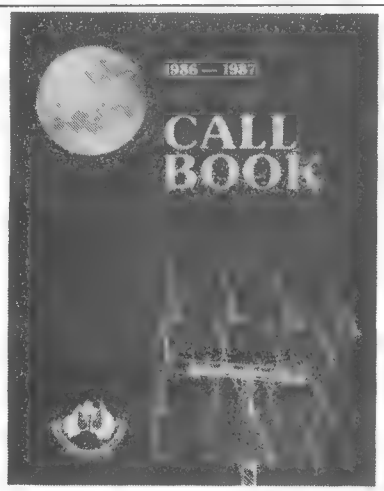

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Report on the FTAC Band Plan Paper

Peter Gamble VK3YRP
Chairman, FTAC

The preparation and issuing of Band Plans was discussed at the 1985 Federal Convention. As a result, the following resolution was passed:

"That the Federal Executive develop, co-ordinate and publicise principles and procedures for the annual review of Australian Frequency Band Plans by Council. These should ensure that there is the maximum possible involvement of Divisions and adequate co-ordination of views of users of all authorised modes prior to the Convention."

To assist this process, the Federal Technical Advisory Committee (FTAC) documented the existing Band Plans. These were the subject of a series of articles in AR earlier this year. "Band Planning" introduced the general subject in January 1986 AR, and was followed by "Band Planning for the High Frequency Bands" in February, and "Band Planning for the VHF and UHF Bands" in April. Existing Band Planning information was researched by the Committee and formed the basis of a paper "Band Plans for the Amateur Radio Service." To this was added material from a variety of Department of Communications (DOC) sources.

Following comments from a number of amateurs, amendments were made to the paper, which was then printed and circulated for discussion at the 1986 Federal Convention. A brief presentation was made on the highlights of the paper by the Chairman of FTAC. Following extensive discussions, both in the formal Convention sessions and during "meal' and other breaks, the paper was adopted with some minor modifications.

The Band Plan paper consists of an introduction, followed by some comments on spectrum management and gentlemen's agreements. A section on Band Planning Philosophies lists six principles for successful Band Plans:

- Accord with international band usage
- Consider all users
- Spectrum must be allocated according to mode requirements and usage
- The Band Plan must be dynamic yet evolutionary
- The Band Plan must include forward thinking
- The Band Plan must be promulgated to all users

DEFINITIONS

An explanation of the "Layered Band Plan" (see February AR, page 20), is followed by the definitions that apply to modulation mode and bandwidth. The following definitions have been accepted for the Amateur Radio Service in Australia:

1 'CW' designates Telegraphy (Morse) with a maximum band width of 200 Hz (200HA1A/A1B)

2 'Narrow Band' designates Narrow Band modes (other than CW) occupying bandwidths less than 1.12 kHz. Narrow band modes use an appropriate modulation technique and speed to stay within the designated bandwidth. Narrow band modes include ASCII, RTTY, AMTOR, and Packet Radio.

3 'Wide Band' designates Wide Band modes occupying bandwidths greater than 1.12 kHz. On bands below 50 MHz the occupied bandwidth is limited to less than 6 kHz (except for AM or A3A which may occupy a bandwidth of up to 8 kHz). On bands above 50 MHz the restrictions on bandwidth are those specified in the ITU Radio Regulations with the proviso that the occupied bandwidth shall not extend beyond the limits of the band being used. Wide band modes include SSB, NBFM, FAX, SSTV, and Data Transmission at greater than 300 Baud. It also includes ATV on bands above 420 MHz.

These definitions were used throughout the remainder of the paper.

The term "exclusive allocation" has been used previously to indicate a single allocation to the amateur service within Australia. However, the correct term is "primary service." Some amateur band segments (and even some complete bands) have the status of "secondary service." Stations of the secondary service shall not cause harmful interference to stations of the primary service. It should be noted that the use of the terms "primary" and "secondary" service in the following Band Plans refers only to the status of the allocation within Australia and does not cover assignments which may be made in other countries to other services. The 7.000-7.100 MHz segment allocated overseas to broadcast stations is an illustrative example.

Then follows the Band Plan for each amateur band from 1.8-1240 MHz. Each Band Plan consists of a preamble describing the general allocation and any requirements that have to be taken into account in allocating frequencies for specific uses. This is followed by a description of the frequency segments that have been allocated to specific uses and any necessary footnotes to describe the reasons for a particular allocation. A graphical presentation of this information is also included in the Band Plan. Also included is the status of each amateur band as indicated in the Australian Table of Frequency Allocations, together with other relevant information on band usage.

CONCLUSION

The paper concluded with the following conclusion and recommendations:

> "The Wireless Institute believes that the present approach by the Department of Communications in allowing the Amateur Service to develop its own Band Plans is the correct approach. Further, the resolution passed at the 1985 Federal Convention and quoted in the first paragraph of this paper is the most appropriate way of developing and approving Band Plans.
>
> Accordingly, the following recommendations are made:
>
> 1 That the revised definitions given in Section 6 of this paper be approved.
>
> 2 That the Band Plans contained in Section 7 of this paper be approved as the official WIA Band Plans."

COMMENTS AND DISCUSSION

The paper was discussed at the Convention on a band by band basis. Some minor amendments were made to the plans for the 7 and 50 MHz bands (see later) and the above two recommendations were then accepted by the Convention. Further work has since been carried out on the drawings and the revised drawings are published in the 1986 issue of the *Call Book*.

It was not FTAC's original intention to modify the existing Band Plans in any way prior to the Convention. However, considerable representations were received on the 1.8 MHz Band Plan, which indicated that it did not conform to current usage. As this had both international and national implications, this plan was revised accordingly.

Other comments have also been received in response to the AR articles. Some of the comments were incorporated in the issue of the paper discussed at the Convention. Unfortunately, it was not possible to individually answer all of the comments received.

At the Convention a number of minor adjustments were made to the plans as originally published in AR. The revised details are as follows:

1. 1.8 MHz Band (160 metres)
A change was made to the Narrow Band and Wide Band segments. The Narrow Band segment now occupies 1.810 to 1.815 MHz, while the Wide Band segment occupies 1.815 to 1.875 MHz. Further, the existence of a "DX Window" between 1.815 MHz and 1.835 MHz was noted. (See Figure 1).

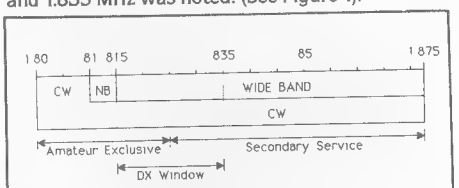

Figure 1.

2. 7 MHz Band (40 metres)
A minor change was made to the Narrow Band (and consequently the Wide Band) segments. The Narrow Band segment now occupies 7.030 to 7.050 MHz, while the Wide Band segment now occupies 7.050 to 7.300 MHz. This was to allow an overlap with the Region 1 Narrow Band Segment. (See Figure 2).

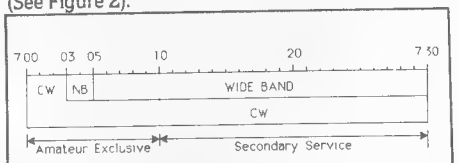

Figure 2.

3. 10 MHz Band (30 metres)
A minor addition was made to the notes accompanying this Band Plan. The complete notes are as follows:

> "The Australian authorities permit Wide Band modes in this narrow amateur allocation and Australian amateurs have seen fit to utilise this privilege, for it is a useful band for interstate contacts as well as DX. The recommended usage for Wide Band modes is within Australia only, but the amateur community may wish to establish a gentleman's agreement to not use Wide Band modes (phone) at all. Note that the Narrow Band overlay completely aligns with the Region 1 RTTY segment.
>
> "Region 3 have opted to permit only CW and Narrow Band operations across the full band allocation. The use of Wide Band modes should, therefore, be restricted to communication within the VK call areas only. Further, only the minimum power necessary to reliably maintain Wide Band contacts should be used."

4. 50 MHz Band (6 metres)
Currently, an FM channel spacing of 25 kHz with a repeater offset of 600 kHz has been defined for this band. However, it has been proposed (and accepted at the Convention) that the repeater offset be changed to 1 MHz, with the repeater input frequencies to now be from 52.600 to 53.000 MHz and the repeater output frequencies unchanged. The interval 53.000 to 53.400 MHz would revert to general use for Wide Band modes. A transition period has been allowed for this change to take place. More details will be published on this later.

Some discussion took place on the 420 MHz band (70 cm) following the appearance of various radio-location services in the 420 to 430 MHz segment. No changes were proposed at the moment, however, the matter is to be kept under review, as is the status of the 576 MHz band (50 cm).

A considerable amount of discussion took place on the Band Plan for the 1240 MHz band (23 cm).

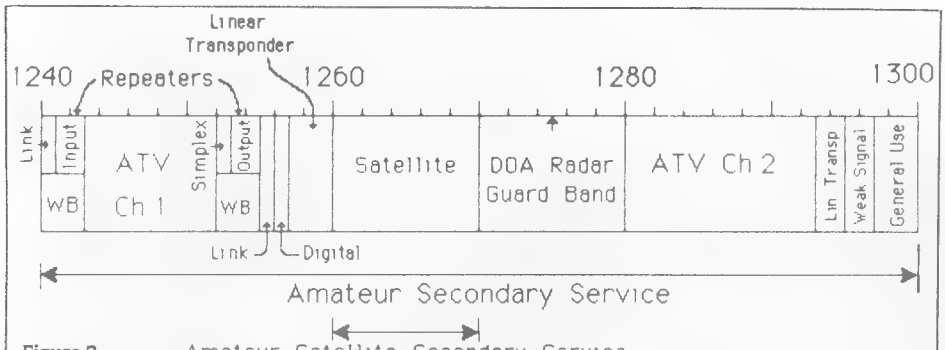

Figure 3.

However, after consideration of all of the issues involved, the Band Plan approved at the 1985 Federal Convention was endorsed. (See Figure 3).

CURRENT ACTIVITY

Since the Convention, the use of the 28 MHz band (10 metres) for FM repeaters has been proposed to the Department of Communications. The arrangements proposed were to use the US standard of 20 kHz channel spacing and a repeater offset of 100 kHz. Repeater input frequencies are from 29.520 to 29.580 MHz and a deviation of 5 kHz is used. Verbal approval-in-principle has been given be the Department for this type of operation, including the use of 5 kHz deviation (16K0F3E). (Note: this will require a minor amendment to the Wide Band definition!). However, there is an indication that the US is considering a change to a repeater offset of 400 kHz. Repeater outputs would be from 29.500 to 29.680 MHz, with repeater inputs moved to 29.100 to 29.280 MHz. This matter is currently being followed up with the US.

The change from a 600 kHz offset to a 1 MHz offset on the 50 MHz band is being followed up with the Department of Communications.

As can be seen, amateur radio Band Plans are not a static thing! Copies of the complete paper are available from the Federal Office or from your Divisions Federal Councillor.

I would like to thank all of the amateurs who contributed to this paper, both during the initial drafting and as a response to the printing of the earlier material in *Amateur Radio*. As a result of the wide ranging discussions that had been held right around Australia on this topic, the Federal Councillors were well briefed when they arrived in Melbourne for the 1986 Convention.

REFERENCES:

1. "The Australian Table of Frequency Allocations" (ATFA), published by the Department of Communications, October 1982 Edition.
2. The Region 3 Band Plans, (agreed in Auckland, November 1985) and reported in *Amateur Radio*, February 1986 issue.
3. The Region 1 and UK Band Plans, reported in *RadCom*, January 1986 issue.
4. The "Revised Amateur Operators Handbook," draft of chapter 5 issued by the Department of Communications, February 1986.
5. The "ARRL Repeater Directory, 1986-87 Edition," published by the ARRL.
6. "Band Plans for the Amateur Radio Service," Issue 2.0, dated July 10, 1986.

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Equipment Review

Ron Fisher VK3OM
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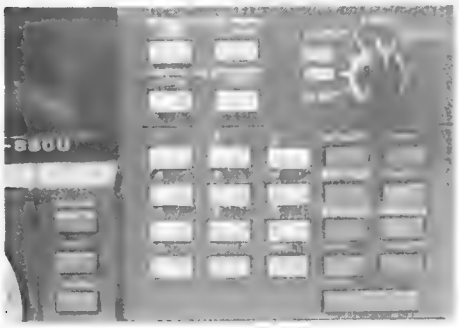
YAESU FRG-8800 RECEIVER

The Yaesu name has, over the last few years, been synonymous with well-designed general coverage communications receivers. Starting with the famous FRG-7, the first really satisfactory, popular- priced receiver. Then the FRG-7000, which featured a digital frequency and clock readout. The FRG-7700, simplified operation by eliminating the preselector tuning, and the the FRG-8800 which has been updated with keypad frequency entry and a multi-function LCD display. The FRG-8800 has been on the local market now for nearly two years and, while this review is perhaps somewhat late, it has given us time to take an extended look at this interesting receiver.

Firstly, let's take a closer look at the 8800 and see what it has to offer, both to the amateur radio operator and the keen shortwave listener.

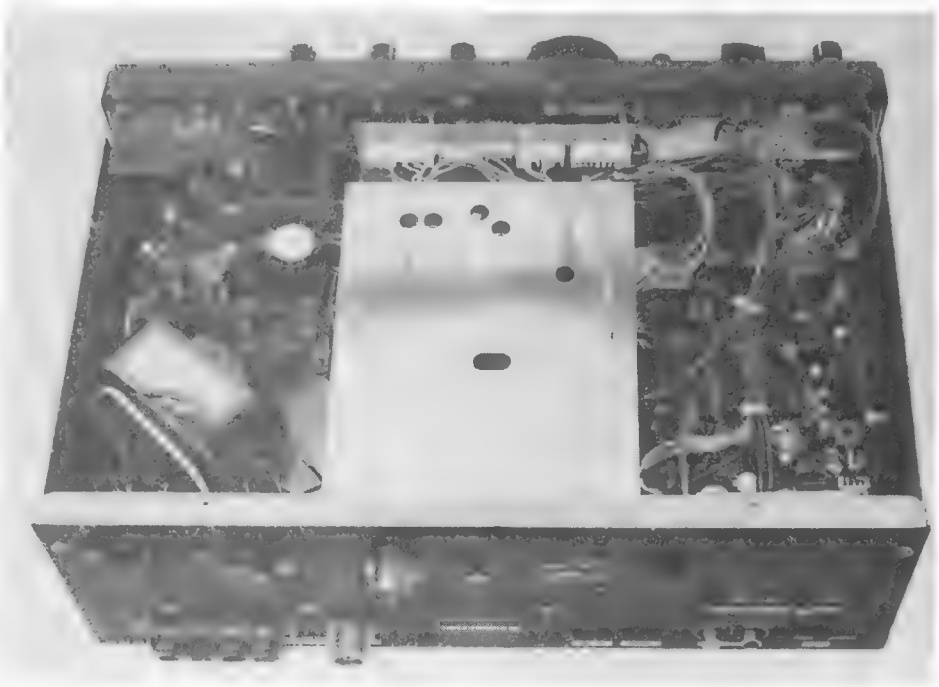
On first inspection the new LCD display is the feature that makes the greatest impact. It combines the frequency readout, S-meter, mode indicator, selectivity status, memory channel number and scan mode selected. I have to admit that the thought of an LCD bar-graph S-meter did not impress me initially, but after extended use of it I am converted to the idea.



Keypad.

The 20 button keypad is used to directly select any frequency within the tuning range, which in the case of this review receiver with the optional VHF converter, covered from 150 kHz to 29.999 MHz and 118 to 173.999 MHz.

All modes are built-in as standard and they include AM, SSB (upper and lower), CW and FM.

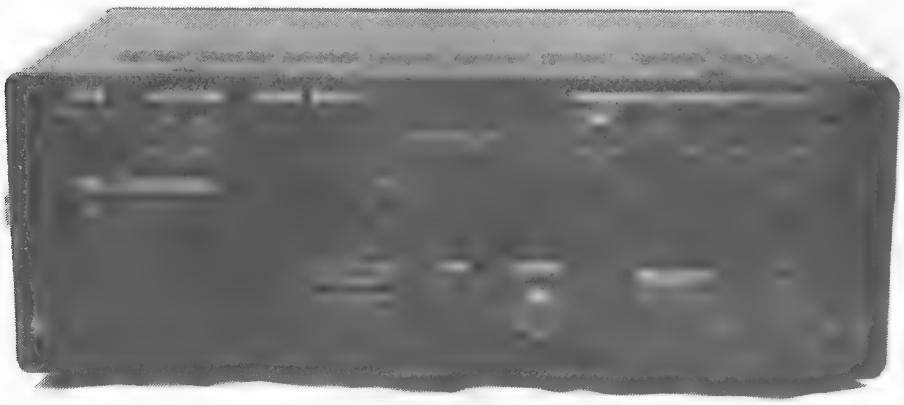


Bottom view — the VHF converter (centre) is optional.

With the optional VHF converter the FM mode is especially useful for the two metre amateur band.

Two, 24-hour clock modes can be selected in place of the frequency readout and these can be arranged to switch the receiver on and off at pre-programmed times. External clock switching will also operate auxiliary equipment such as tape recorders.

The general presentation of the receiver is good. All controls are well spaced out and of reasonable size. The forward facing speaker produces excellent audio quality. The memory system enables frequency mode and selectivity selection to be retained. However, it seems odd that Yaesu did not provide a Lithium battery system to retain this information. Instead, three AA pen light cells are fitted into a rear panel container. As long as the receiver is connected to an AC power point, there is no drain on these batteries, but should the AC supply be removed the drain on them is quite high and the life of them is rather short. Just why Yaesu did not install a Lithium is known only to them!



Rear Panel.

I must say that I did enjoy using the VHF coverage. The sensitivity on the two metre band was quite comparable to most of the current transceivers for that band. Coverage also includes the aircraft band, so you can listen into the action from your local airport.

A dual width noise blanker is fitted. Unfortunately, the width selection switch is located on the rear panel, when there is plenty of room for its inclusion on the front panel between the NAR/WIDE and AGC switch. In spite of this, the blanker works quite well with the wide position being reasonably effective with the Woodpecker and troublesome power line noise. The narrow position is most effective against car ignition noise, although I find that car ignition is not the problem it used to be. Most cars seem to be very well suppressed these days.

Three types of frequency scanning are built into the 8800. These are memory scan in which each of the 12 memories are selected in turn. The scan pauses for about half a second on each channel and can be stopped and started by pushing the pause button.

The second is a selective memory scan in which preselected memories-only are scanned, and thirdly, the programmed band scan. Scan limits are programmed into the memories and the scanning rate can be changed by selecting either the fast or slow tuning rates.

In the manual tuning mode, the two selectable tuning rates are well chosen. The slow tuning rate is at about six kilohertz per turn of the tuning knob. In the fast rate, 125 kHz are covered per knob revolution. In view of this, it is a little hard to know why Yaesu have added a fine tuning control. I did not find any practical use for it at all.

With the exception of the FRV-8800, all of the other options are remnants from the earlier FRG-7700 receiver. In saying this, I do not mean to infer that these are in any way inferior. It just seems odd that Yaesu did not at least up-date the identification numbers. Anyway, they are the external VHF converter, the FRV-7700 which covers three bands, including the six, and two metre amateur bands, and the aircraft band. The FRT-7700 antenna tuner and the FRA-7700 active antenna.

I have not had the opportunity to try any of these so of course cannot comment on their performance.

Frequency selection via the keypad is a little unusual. Both the megahertz and kilohertz can be selected independently. As an example, press 21 and it will appear in the kilohertz section of the display, but pressing the orange megahertz button transfers this to the megahertz section of the display and the receiver is now tuned to 21 MHz. It is easy once you get used to it! The same system works if a change of, say several hundred kilohertz are required.

All controls operate in a smooth manner, especially the main tuning control, which is a delight to use. The attenuator control is actually an IF gain which produces a smooth progressive action. The squelch will be most used with the VHF converter for FM reception and the tone control produced a progressive top-cut in the audio output quality.

The least liked feature was the flip-down legs at the front of the receiver. They did not lift the front high enough and had an annoying tendency to flip-down unexpectedly! A chrome wire bale would be a big improvement.

FRG-8800 UNDER TEST

The following test equipment was used to produce our figures.

A Marconi TF-995A/5 RF signal generator; AWA F-242A noise and distortion meter; and a Daven audio power output meter.

Firstly, the audio power output of the receiver was checked with the following results:

8 ohm load	1.0 watt	1.3 percent distortion
	1.5 watts	10.0 percent distortion
	2.0 watts	32.0 percent distortion
4 ohm load	1.5 watts	8 percent distortion

These figures were taken in the SSB mode with a 1 kHz beat-note to also indicate the product detector distortion which is quite good. However, the maximum audio power output is rather low.

Distortion in the AM mode was next measured and found to be four percent at 30 percent modulation with a 1 kHz tone.

Distortion with FM mode selected and the generator set at 3 kHz deviation with a 1 kHz tone was measured at two percent.

With the audio gain control at zero, noise output from the receiver was measured at -60 dBm, a very creditable figure.

Next the audio response for AM reception was checked. This was measured in the normal AM selectivity mode. It is possible to select the narrow SSB selectivity for AM reception.

Frequency	60	80	100	200	500	1k
Response	-10	-7	-5	-2	-.5	0
Frequency	1.5k	2k	2.5k	3k	4k	4.5k
Response	-1	-3	-7	-9	-11	-13 dB

This shows that the AM bandwidth is rather wide for serious shortwave DXing. Unfortunately, no optional high grade filters are offered as options.

The audio response was checked for SSB reception.

Frequency	200	500	1k	1.5k	2k	2.5k
Response	-10	-.5	0	-.5	-1	-4
Frequency	3k	3.5k				
Response	-8	-15	dB			

This again shows that the selectivity is rather wide.

Sensitivity was checked in the SSB mode at several frequencies.

At 14 MHz	1.0 μV	23 dB s/n
	.1 μV	6 dB s/n
At 146 MHz	1.0 μV	25 dB Sinad
	.5 μV	15 dB Sinad.

The calibration of the LCD 'S' meter was checked at 14.200 MHz.

S-meter reading	S3	S5	S7	S9	+20	+40	+60
Signal generator output	2.5	5	10	25	100 μV	1 mV	10 mV

The S-meter is also calibrated in the widely used SINPO scale of one to five. This is used by shortwave broadcast listeners.

INSTRUCTION BOOK

The owners manual for the receiver is excellent from the point- of-view for operating and setting up the equipment. However, it contains only limited technical information. There is no circuit diagram or even a block layout.

However, let us look at the positive side of the book. Control functions are covered in detail. There is a short discussion on suitable antennas for both HF and VHF reception, but unfortunately, only dipoles receive recommendation. Quads and Yagis are dismissed as being narrow band devices, although a log-periodic array is okay if you can afford one.

It is a pity that some wide band antennas are not described.

Several pages are devoted to the optional computer control of the receiver — it will be interesting to see how many listeners take advantage of this facility.

CONCLUSION

There is no doubt that this receiver is by far the best from the Yaesu factory so far. Perhaps the 12 memories are a little on the light side and certainly well down on the Icom 32 and Kenwood 100.

Selectivity is certainly on the wide side and it is unfortunate that better filters are not offered as options. (In the United Kingdom, upgraded receivers are offered at premium prices by Surry Electronics).

For all of that, the receiver is very easy to operate and, with the optional VHF converter, offers facilities not easily obtained in any other receiver.

If you are looking for a general coverage receiver for shortwave listening, or as an auxiliary set for the shack, the FRG-8800 would have to be seriously considered.

This review receiver was supplied by Dick Smith Electronics, to whom all inquiries should be directed.

Internal View from Top.

QSP

AMATEUR OPERATOR'S HANDBOOK

It is planned to produce the new operator's handbook in brochure format. The book will comprise three separate brochures — one covering Regulatory and Licensing Conditions, another on Syllabuses and Certificates, and the last on Procedures and Guidelines.

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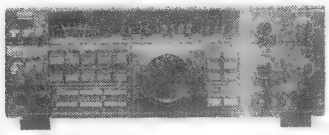

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R-71A

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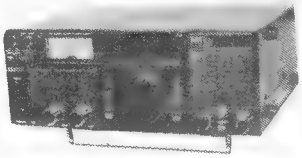

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CN-620A, SWR/Power meter	POA
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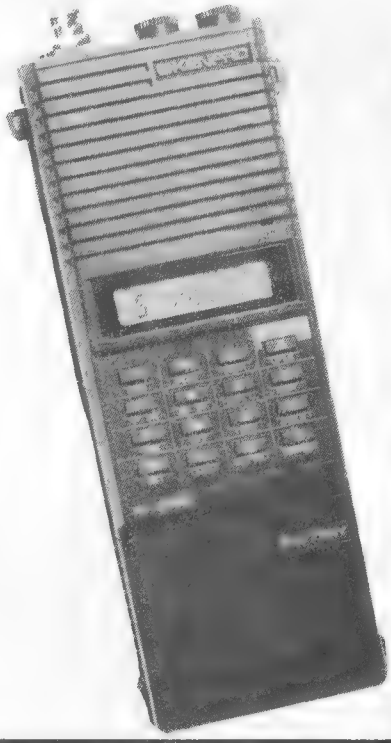

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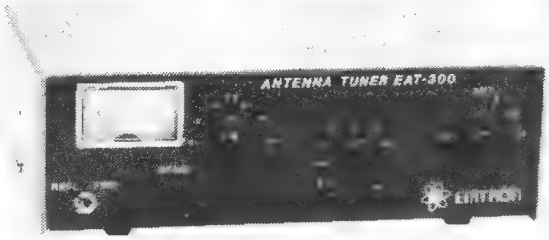

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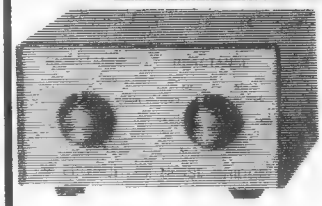

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VIC:
288-294 Queen St, Melbourne, Vic. 3000
Entrance from Little Lonsdale St
Ph:(03) 67 9551 or 670 0330

QLD:
416 Logan Rd, Stones Corner, Qld
Ph:(07) 394 2555

How's DX?

Ken McLachlan VK3AH
Box 39, Mooroolbark, Vic. 3138

It was thought that every amateur knew the regulations to our privileges of operating in the spectrum, particularly in regard of interference to another amateur or legitimate transmission in a shared segment of the amateur's allocation.

Apparently, there is a rise in the incidence of deliberate interference to our fraternity and it is trusted that it is not a fellow hobbyist-experimenter, who would be reading these notes, that is responsible.

Fortunately, there are methods of tracking down such menaces and it would be advisable to take note of times and dates in UTC, frequency and duration of the interference in the station log. Advise your nearest Department of Communications office and drop a line to your State Intruder Watch Co- ordinator. Other amateur/s may also report the same incident, collaborating your observations, and giving the authorities something to work on.

If you have any suspicions as to who may be the offender, it would be wise to discuss it with the Radio Inspectors, where it will handled in strict confidence allowing them to conduct an unhindered and, if necessary, an effective visit. Offences of this type, if successfully proved in a court of law, bring heavy penalties to the offender and the loss of their equipment without personalities being involved.

Precise documentation is a must and collaboration of your observations are invaluable to the Department. Remember it is only an infinitesimal minority that cause trouble and generally they are not licenced to operate in the amateur bands, or any other part of the radio spectrum for that matter.

PROVE THE CRITICS WRONG!

Who said the bands were dead and DXing was a lost cause?

One amateur has proved the critics wrong, through his persistence and tenacity of setting a goal and keeping to it. Bill VK1WB, has worked 40 zones in less than five months using the 10, 15 and 20 metre bands. No, he was not running 100 kW ERP from a 10 over 10 multiband antenna, 100 metres in the air and staying at the rig for 24 hours-a-day, according to his log which he forwarded to me. The 200 contacts listed are all of interest, with contacts listed that many VK amateurs would donate their "eye-teeth" to have listed in their log.

Bill was using a 20 year-old SR150 and a 17 year-old SB200, directly coupled into a two-element 14 MHz, three-element 21 MHz and four-element 28 MHz quad, 14 metres above ground. Nothing special, but the credit for the achievement is his tenacity, listening and scanning of the bands — not overlooking 10 and 15 metres.

Congratulations Bill and thank you for the comprehensive list of QSL managers and addresses that you forwarded for the next listing which will be published as space permits.

By the time you read this Bill hopes to be active with a VK4 call sign. Changing call signs is not new to this gentleman. In 1948, he operated as VK3AWN, 1951 as VK3WL, and in 1968 signed VK3WL/WZ, and of course, not forgetting VK1WB.

Ladies and gentlemen, can anyone equal or better Bill's achievement at this point of the sunspot cycle?

ZONES WORKED BY VK1WB as at 0100 May 31, 1986

CALL	TIME	DATE	BAND	ZONE
KL7H	0500	17/03	14	01
VE2NN	0320	21/05	14	02
VE7ATP	0003	04/03	21	03
KA5SMA	0621	23/02	14	04
W2ORP	0715	09/01	14	05
XE1J	0234	06/03	14	06
TI2OY	0559	26/01	14	07
VP2EE	0607	22/01	14	08
P4/KQ2M	0648	16/01	14	09
HC2HX	0627	26/01	14	10
PY4LJ	0710	18/01	14	11
CE3GZU	0544	16/01	14	12
LU1FZR	0648	09/01	14	13
DJ4ZB	1118	01/01	14	14
HG19HB	1036	05/01	21	15
UO5OEK	1038	05/01	21	16
UJ8JCQ	1111	01/01	14	17
UA9TE	1119	05/02	14	18
RA0JD	0702	11/01	14	19
4Z4NM	1140	07/01	21	20
A4XKC	1223	19/01	14	21
VU2TTC	0520	11/01	14	22
JT1AS	1205	19/04	14	23
BV0BG	0559	05/01	14	24
JC1EHR	0612	01/01	28	25
HS0A	1045	29/03	14	26
DU2JL	1221	24/02	14	27
V85GA	0541	01/01	28	28
VK6AI	0721	11/01	14	29
VK3NDH/2	0136	03/01	28	30
KH6JJL	0004	08/03	28	31
ZL1AQ	0120	03/01	28	32
EA8BML	0842	04/03	14	33
GT2MG	0637	01/05	21	34
5N8ZHN	0730	16/03	14	35
9J2WS	0751	06/04	14	36
5X5GK	0720	06/01	14	37
ZS5YG	0549	11/01	14	38
3B8FP	0503	02/01	14	39
JW5E	1222	16/03	14	40

READERS

Nearly everyone is interested in another operator's station. *Are you?*

I would like to commence a series — *My Station* — with a photograph, complete with the operator of course, and a brief description of the equipment and the operator which will be reproduced as space permits. Can you participate? If so, please forward details to me via the address at the head of this column. All photographs will be returned after reproduction.

The management of GFS Electronic Imports, are kindly donating a prize for the best photograph and story printed during 1987 — so ladies and gentlemen, start writing. Black and white photographs are preferable, however sharp, clear colour ones are suitable.

MAIL FROM LEBANON

Difficulties for Lebanon, as it appears they have postal problems, and according to overseas publications, it is recommended that all mail be sent via Cyprus. It is then transferred from Cyprus by courier. At the time of writing these notes, Australia Post were not aware of any problems with letters though!

MOUNT ATHOS AGAIN

The Italian expedition was not permitted to proceed to Mount Athos. Apparently, they had a licence for "scientific research of the sunspot cycle."

There is no reciprocal agreement between Greece and Italy and the Greek authorities confirmed that there was to be a "scientific" expedition in the future, not a DXpedition. The Greek Society members were surprised when they discovered that the expedition was to be made by four noted Italian DXers, and wondered if it was to be made up of endless 5x9 QSOs.

The Greek Society learned that the Greek Civil Authorities and the Religious Authorities had granted a "permit" on scientific grounds, but these permits were reversed when the true story was known and the licenses addended by the Greek Government to read "no amateur transmission will take place for a scientific expedition."

It is maintained by the Greek Society that they did not interfere or insist on a cancellation of the permit to operate, but it is one of those things that we are left to ponder about. Also, who "conned" who or was it a misunderstanding from the start? Is it all in the best interests of the hobby?

My mention that an Australian monk is based at Mount Athos is true and it may well be that Mount Athos will be operated by its inhabitants in the future. This would put a stop to all the petty arguments. We, as DXers, wish them well in their endeavours to obtain their own licensees, but they may need assistance with their equipment due to economics, so be prepared for a fund to assist with donations if a major equipment manufacturer does not come to the fore. (Remember, China was assisted greatly by equipment manufacturers when they first came on-air!).

RALEIGH

Operation Raleigh is getting closer to our shores. I assume they will have no trouble getting a visitors licence from our country. When last heard they were in Fiji. All QSLs go to G4AAL, who left the vessel in Fiji and returned home. QSL via the bureau (the cheapest route) or direct if you require a card.

INTERNATIONAL REPLY COUPONS

International Reply Coupons (IRCs) are now 80 cents at Australian Post Offices, with a redeemable value of 55 cents for a stamp to another country. It really does pay to be a WIA member, as this is one of the advantages of saving money by going through your local bureau. If State bureaus care to send me their addresses, they will be printed in a forthcoming issue of this magazine.

HAVE YOU HEARD OF IT?

Itaparicia Island, PT7BR/PY6, operated from this area recently. Believe it or not, my "modern" atlas does not list it, however an atlas bought at a "junk shop" for 20 cents many years ago lists it as near Brazil.

If not on your list, it may be well worth getting a QSL card as it is IOTA SA-23 for those interested in collecting islands for the IOTA Award.

FAVIGNANA ISLAND

Favignana Island and, wait for it, Rabbits Island, situated in *CQ* Zone 33, were active under the calls, I4ALU/IG9 and I4ALU/IF9 (IOTA AF-19).

These islands are located off the coast of Lampedusa Island, near the shoreline of North Africa, and the western coast of Sicily. A new IOTA island for you? QSL I4ALU and good luck.

JAPAN

KA2PF, is located in Tokyo. The KA2 prefix with two letter suffixes are issued to service personnel in Japan. The QSL address is W6CNA. This operator hopes to do a stint from Ogasawara later this year using a 7J prefix, with the same QSL information. We wish him well and hope there are some VKs in the log!

SPECIAL PREFIX

GB9DB, was from Great Britain to celebrate 900 years of the Doomsday Book of William the Conqueror. The Gs are certainly getting with it for issuing special call signs. Good or bad, it is one to have in the log and QSLs are via G4AYM, bureau or direct.

RTTY ENTHUSIASTS

Probably a new one for you, ZC4JA, is active in this mode from the Sovereign Base area. Watch for him on 14.096 MHz and get him in the log.

MOZAMBIQUE

C92AJ, has been reported operating from this area. Permission to operate is dubious, so hold direct QSLs until further advice is received.

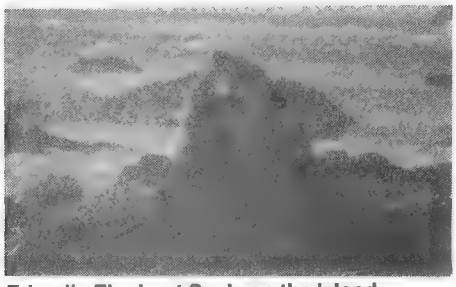
MACQUARIE ISLAND

An excellent way of spending time on Macquarie Island, a much sought after DX Country and one of the outposts of Australia's sub- Antarctic, has been adapted from an article by one who has spent time on the island, Peter Arden, a Meteorological Observer.

One form of entertainment is to participate in field trips using the numerous field huts located around the island's coast.

The island is 37 kilometres long and about five kilometres wide, so one needs about 10 days to visit all the huts in one attempt. Most of the island is a 300 metre high plateau with steep cliffs down to the coast.

The plateau is exposed to the worst of the weather but the walking is quite easy as trails are well marked and easy to follow.



Friendly Elephant Seals on the Island.
Photograph courtesy Dave Shaw VK3DHF

The coast has a number of hazards for the walker. One of them is the one metre tall tussock grass with deep seal wallows between. Most of the tussocks are fairly stable and jumping from one tussock to the next is relatively simple. Occasionally, the odd tussock is unstable and tends to collapse tipping the walker waist-deep into a foul smelling, brownish-green slime. This eventually happens to everyone making the trip around the island.

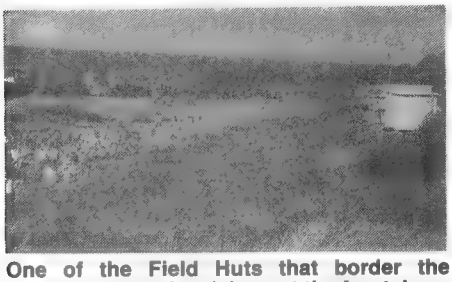
The next hazard that can be encountered is a long stretch of feather bed — a very wet bog, apparently bottomless in places.

Elephant seals are everywhere and block the only route. Attempting to move them only makes them more aggressive.

Some of the large Penguins one encounters on a walking trip around the Island.
Photograph courtesy Dave Shaw VK3DHF

Another hazard is the penguin rookeries. To find the route blocked by half a million irate, noisy penguins can be awesome. The environmental way to avoid the rookery is to walk through the surf, but the more practical and popular way is to walk slowly through the penguins and take what comes — sometimes displeasing!

Wherever one wanders on the island the weather is frequently windy with rain, drizzle, snow, hail or mist — sometimes all combined — which is unpleasant and a field hut is always a welcome sight after a long walk.



One of the Field Huts that border the coastline. Note the visitors at the front door.
Photograph courtesy Dave Shaw VK3DHF

The huts vary from a two-person shack with tiny windows to a very comfortable "lodge" with panoramic views of the coast and wildlife. All are stocked with food (mostly canned or dehydrated), fuel and other essentials, so one only has to carry a light pack. The huts are restocked in the summer time by helicopters. Kerosene heaters provide warmth, and Tilley lamps and generators light. Gas is available for cooking a much-earned hot meal.

There are no "mod cons" (toilets), so in the interests of environmental protection, one must go down to the beach below the high-water mark and keep a look out for a big wave. After some trial and error one becomes quite skilled at this operation even in force eight winds.

A shower consists of a bird-bath outside. The weather is not always bad and there is plenty of opportunity to leave the huts and explore the plateau, cliffs, waterfalls, vast slopes and gorges, or photograph the penguins, seals, albatrosses and other wildlife that are abundant on the island.

Hiking around Macquarie Island and relaxing in the huts is an enjoyable and interesting experience.

Well Peter, I am afraid I would rather walk to the local shops and take my chances of being hit by a "billy-cart", bike or car, and suffer the pollution on a sunny day . . . but on the other hand, I do not have much exercise . . .

A number of amateurs have visited Macquarie, two in particular come to mind, the first being Dave Shaw VK3DHF ex-VK9ZD and VK0HI, of Heard Island fame (who used to enjoy the walking trips), and Denise Allen VK0YL, the first lady amateur licensed on Macquarie Island. Denise enjoyed the area so much that she returned to a colder Antarctic base for a further stint within weeks of returning to Melbourne.

The following table shows the weather for July on the Antarctic-bases and it certainly makes one feel more comfortable about the winter we endured in Melbourne this year, although it was probably not as bad as Canberra, which had -8 degrees Celsius one morning. (Probably the morning the Budget was handed down!).

	MACQ	DAVIS	MAWS	CASEY
Mean station level pressure	996.7	980.1	981.2	980.7
Highest maximum temperature	7.7	-3.4	-8.8	-1.2
Lowest minimum temperature	-5.2	-35.1	-35.1	-29.2
Mean daily sunshine hours	1.0	0.0	0.0	0.0
Mean speed wind (knots)	13.2	9.5	0.7	0.7
Maximum wind gust (knots)	61.0	82.0	68.0	94.0
Days of strong wind	25	12	30	17
Days of gale force wind	25	4	14	12
Days of blizzard	0	4	3	6
Days of rain	29	0	0	0
Days of snow	14	15	5	17
Total rainfall (mm)	88.4	0	0	0
Total snowfall (mm)	0	39	0	13.2

Well, we thought the southern states were cold, and the northern states will be shocked at these figures, however I know where I would prefer to be with temperatures like that — by a cosy fire.

RECOVERY

It is reported that young Eric L30042, is slowly recovering and it will not be too long before he is back monitoring the bands. Good luck Eric and speed that recovery along!

MARION ISLAND

A note from Percy VK3PA, gives an insight into the much wanted DX country, Marion Island and the companion island, Prince Edward, both of which are under South African control.

Marion Island, is mainly a weather station located approximately 3200 kilometres south of Capetown. A tour-of-duty usually lasts for about 14 months.

Temperature varies from -5 to +10 degrees Celsius, complimented by high winds and heavy snow. Not an inviting holiday resort for sun-lovers by any means.

Some of the staff, as part of their duties, visit Prince Edward Island about twice a year. This island is uninhabited and the visit is to check the welfare of the area and the wildlife that is abundant.

Many years ago, mice came ashore from a ship visiting Marion Island, quickly multiplied and commenced dining on the birds eggs, drastically upsetting the ecology. The authorities had no option but to bring cats to the island to remove the mice. This was successful, however, another problem came to the fore — the cats, after finishing the mice, commenced dining on the birds and another ecology problem emerged! Dogs were then brought to remove the cats, a disaster that did not work and the dogs were transported back to the mainland.

One of the tasks/problems of the staff is to remove feral cats, a difficulty compounded by the number of cats against staff, whose number one priority and most important duty is weather observations.

The latest group on the island had an amateur on-board but he unfortunately only had a ZR licence (restricted) and did not apply for permission to operate until the day before the vessel left. Another amateur operation, due to the time factor and the operation, unfortunately was classed as being illegal.

The authorities are quite willing to grant operating permission to fully licenced amateurs going there for a tour of duty.

Lew ZS1SL and Nick ZS6BBY, supplied the above information to Percy and they mentioned that a well known DXer was intending to visit South Africa in October with a view to seeking permission to operate from this much wanted area. It is hoped that his negotiations were fruitful and we may hear ZS2 on the bands in the near future.

JAN MAYEN

Svien JX8KY, is working from the island during their winter months using a five element monobander on 20 metres. He hopes to also activate the lower bands as time permits and erect some suitable dipoles.

PALMYRA AND KINGMAN REEF

Plans are being formulated to activate this area in September 1987. It is early days yet and some of the operators involved are DL8NK, F6EXV, W0RLX, K8CW, and WA2MOE.

It is also intended to combine efforts with SM0AGD and activate 1S. My previous comments on the activation of this area still stands and due to the dangers involved I feel it should be *deleted* from the DXCC list immediately. Life is very precious and the risks are too great in this particular area.

QSL HEADACHE

The New Zealand licensing authorities have allowed the use of single letter suffixes for contest groups and special event stations. As it is possible that these will be re-issued after a short duration, who gets the QSL, and will the sender get one in return? The NZART Headquarters have a permanent allocation of ZL6A for special events and all QSLs go to the ZL Bureau. It would be prudent to inquire from the operator during the contact, of the QSL route when working one letter suffix ZL stations.

CONTROVERSY

The ARRL DXCC controversy is hotting up. Many are saying that they do not want to see a change, some say it gives everyone a fair go if it was recommenced, whilst others say that it has lost its creditability.

I personally cannot go along with the latter two comments, although it has been pointed out to me that many people have received blank cards to rare countries and they can, if they wish, fill them in and hope they are accepted.

I have received blank cards from various countries in the world and, with another VK, they have been returned to sender with some terse remarks. There is also a story of an amateur who wanted to set-up a sched for a certain rare country, and he wrote in good faith and received a QSL with no QSO. Is this honesty or fair sport? I feel that this type of occurrence is an infinitesimal percentage of all cards sent around the world every year, but it still occurs unfortunately and no rules, regulations or starting the DXCC from scratch again will ever deter the one dishonest person. Generally, the cheat is only known to himself and he has to live with his conscience — if he has one!

Some ARRL DXCC members have been banned over the years for forging cards and it is felt that the administration, in checking submitted

cards, are doing their utmost to stamp out such practices.

It will be interesting to see what John W4FRU, comes up with after consultation with his committee and whether the ARRL will adopt the recommendations. It is hoped that all concerned take every aspect of the implications that could occur with even minor changes.

Being personally critical, it is felt that the items such as the admittance of the Pribiloffs, 4U1VIC and a temporary deletion of 1S are far more important at this juncture.

FO0XX CARDS

The latest word is that they have been received from the printers but will not be mailed until all are filled out. Do not blame the mail service but wait patiently until they arrive, hopefully as a Christmas present!

PLAN AHEAD

The 1987 International DX Convention, sponsored by the Northern California DX Club, will be held at the Grosvenor Hotel in Visalia, on April 3 to 5, next year.

Further details may be obtained from the Publicity Officers, Jan and Jay O'Brien, the folk with the massive aerial (refer *How's DX* September AR), PO Box 700, Rio Linda, CA 95673-0700, USA.

JARL

A number of well known Japanese DX enthusiasts are trying to activate a number of rare countries under the JARL banner, to coincide with the JARL's 60th Anniversary.

LUXEMBOURG

A number of PA stations and one G-licensee were due to activate LX last month. All QSLs to PO Box 356, Dordrecht, Holland, or as instructed by the operator.

FRENCH BUREAU

A number of sources indicate that the French QSL Bureau is in a state of chaos since moving from Paris to Toulouse in March. Be prepared for a long wait or reluctantly spend a couple of dB and send direct.

FOUND

Through the help of *QRZ DX* and a couple of diligent sleuths, Bob VQ9BP has been located. He has the logs and cards and his QTH is PO Box 3152, Spartanburg, SC, 29304, USA.

CORA

The Radio Club of French Polynesia (CORA), was trying to sponsor a Clipperton Island DXpedition. The call will be FO8AA and operators so far include FO8JP (an experienced CW operator) and FO8LP. Timing is unknown.

BITS AND PIECES

TY9ER was a pirate, so save the paper-work. **TY1ER** could be the same operator! Work first — worry later. ** **ZD9BV** will be QRV from Gough Island for about three years. ** **Essat SU1ER** is still quite active — work him on his Thursday and Friday. Do not forget to get his daughter, who is also licenced, on the microphone. ** **VO2DX** was quite active recently from the much sought after **Zone 2.** ** **Heard Island** is being activated for scientific studies by the Australian Antarctic Division as from January 1, next year. How soon will Heard be heard again? ** **Joe W3HNK** has received over 2000 QSLs in unopened letters from **TI9CF**. Joe is taking over the duties to clear up the mess. Thanks Joe! ** It is possible that **Chatham Island** will start to climb the wanted list as the authorities are starting to wind down operations from this area. ** Friends of **Tom VR6TC** will be sorry to hear that he is in ZL for extended medical treatment. Good luck Tom, and to your daughter Jackie, who is commencing secondary schooling in New Zealand. ** **KH9AC** and **AH9AC** are active from **Wake Island**. Bob is very interested in 160 metres, so you "low band" enthusiasts go to it. ** Another operation from **5N**, **5Z**, **5H**, and **5X**. Chuck had medical problems, however he is at it again after recovering from an often fatal strain of Malaria which he contracted. If you were lucky, QSL to **WK6T**. ** **Krishna 9N1MC** who is the Chief Engineer at the Ministry of Telecommunications in Nepal QSLs quite promptly. ** **Ascension Island** only to a list! I do not believe it, but they are active as **ZD8DP** and **ZD8SW**. **Stuart ZD8SW** is working at the BBC relay station on a two year assignment. Their favourite frequency is **14.218 MHz**. ** **A22DP** is quite active for those that need this country. ** **Jim VK9NS** based on Norfolk Island, is now a member of the CQ "Hall of Fame. ** One American magazine is cutting its content due to the world economic structure. Quite a shame and apparently Australia is not alone with such problems! ** **Sojo VK0SJ** leaves Macquarie Island in December and reverts back to his normal call, **VK7ZSJ** in Tasmania. ** **TL8BA** is quite active, and if lucky, QSL to **SM2NOO**. ** **Andorra** was activated on both CW and SSB in September. If lucky, and you did not catch the QSL addresses, they are **C30AAN** to **DL8OH**, **C30DAJ** and **C30DAK** to **ON4TJ**. ** Still on Andorra, the **C30BBP**, **C30BBX** and **C30CYA** operation was around 10 000 contacts. QSL to **PA3BMJ** direct or economically through your bureau. ** **Dale VQ9QM** is putting up a 160 metre antenna. Band enthusiasts look for him at anytime when conditions are favourable to Diego Garcia. ** The **Australian Commonwealth Meteorological Bureau** is expanding its participation with Australia's satellite **AUSSAT**. ** Another station active from **Franz Josef Land** is **UA1OHL**. This is a backup for **UV1OO** and **RZ1OWA**. ** **Baldur DJ6SI** has been active as **5Z5EXP**. ** **Don V3CH** has a new call sign, **V31PC**. QSL to PO Box 7, Punta Gorda, Belize. ** **Bjarne JW8FG** is not a member of the local radio society, therefore QSL to Bjarne, Bear Island, N-9176 via Norway. There is a weekly helicopter service to the island, weather permitting. ** **9X5WP** went QRT on August 10. ** **John 5W1FT** and his wife **Mary 5W1FM** are active around 14.194 MHz about 0400UTC daily. ** Any **ZA** expedition has apparently died a natural death — unfortunately. One day it will appear, but everyone is asking when? ** **Bouvet Island** may appear this year or early next year for a very short duration, weather conditions being favourable! ** **Don Search** the person in charge of the **ARRL DXCC Desk** assistant has been upgraded, so Don is, after catching up with the backlog, looking for another contender for the position. ** **GB6RC** was used to coincide with the Scottish Amateur Convention.

THANKS

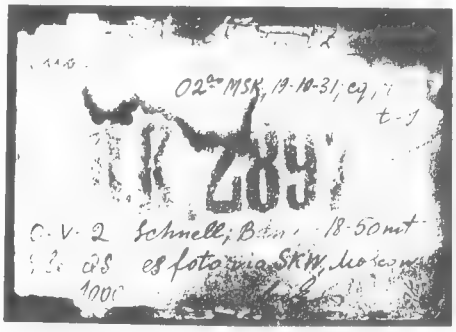
Sincere thanks are extended to the following:

The Editors of weekly, biweekly and monthly newsletters including the ARRL NEWSLETTER, BARG, CQ-QSO, DX FAMILY FOUNDATION NEWSLETTER, INSIDE DX, JAN and JAY O'BRIEN'S QSL MANAGER LIST, KH6BZF REPORTS, LONG ISLAND DX BULLETIN, PAPAKURA RADIO CLUB BULLETIN, QRZ DX, RSGB DX NEWS, and THE WESTLAKES AMATEUR RADIO CLUB NEWSLETTER.

Magazines including, BREAK IN, cqDX, DX POST, JA CQ, JARL NEWS, KARL NEWS, QST, POLICE LIFE, RADCOM, VERON, WEATHER NEWS and WORLDRADIO

Members who have contributed include VKs 1WB, 2PS, 2EBX, 3DHF, 3PA, 3YL, 3XB, and VK6NE. Also, Christa Stuckle, Peter Arden, KH6BZF and WB6GFJ. Sincere thanks to one and all who have made this months column possible.

ANTIQUE QSL CARD
courtesy Peter Wolfenden VK3KAU



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YOUR business card advertisement could go here! See page 22 for details.

ITALIAN ROBOT/BEACON STATION

Robot station, IY4M, operates on 28.195 MHz, with either two or 20 watts output to a ground plane antenna. To contact IY4M, listen for a beacon sending *IY4M Robot QRV*. Send your call twice, being careful not to leave any extra space between characters. If the Robot hears your call it will ask for a signal report, then send you a report and a greeting.

—From *The ARRL Letter*, August 15, 1986

AMATEUR WINS

The Superior Court of California, county of San Francisco, ruled in favour of Mary Matheny KB6CLL, when she was sued by a neighbour for allegedly causing RFI.

The court ruled that the state court lacked authority to regulate and control amateur radio operators, radio emissions and radio frequency interference. The court said; "The Federal Communications Commission has the exclusive right and power to regulate, control and sanction amateur radio operations and radio frequency interference."

The court then granted KB6CLL's request for a summary judgment. This case will be an important reference for amateurs facing similar legal actions in the USA.

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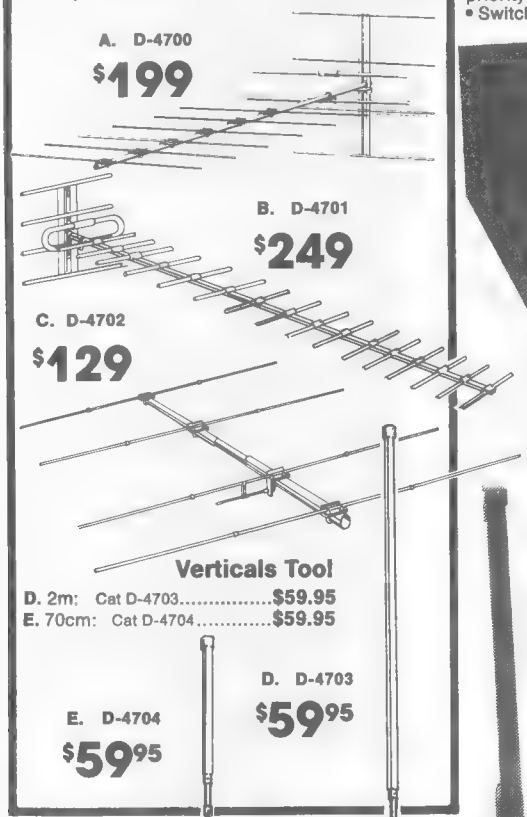
B. 70cm, 18-element Cat D-4701	$299	$249
C. 6m, 4-element Cat D-4702	$199	$129



Verticals Too!

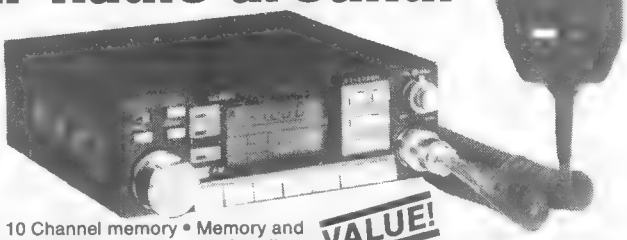
D. 2m: Cat D-4703.....$59.95
E. 70cm: Cat D-4704.....$59.95

D. D-4703 $59.95

E. D-4704 $59.95

2-in-1 value! 2m and 70cm...

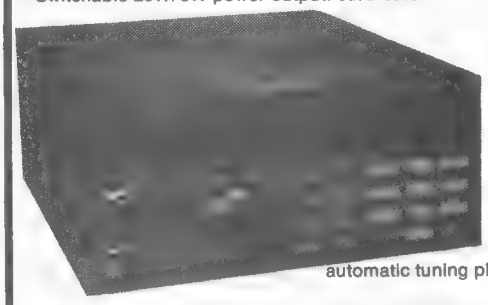
FT-2700R



Here's the unit every amateur would want! Switchable 2m and 70cm bands for a wide range of amateur action. And this affordable, compact unit offers all the famous Yaesu features: • 10 Channel memory • Memory and priority scan • Dual independent front ends • Duplex crossbanding • Switchable 25W/3W power output. Cat D-3515

VALUE! ONLY $1199

Your passport to UHF/VHF listening...

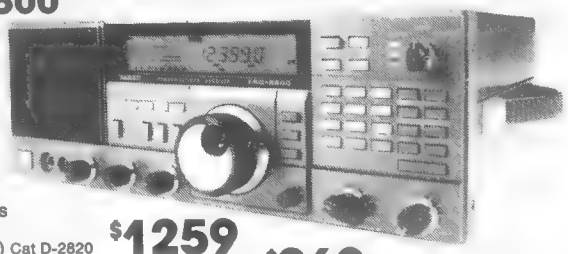


Yaesu's brilliant FRG-9600 scanning receiver for full 60-905MHz action over the VHF/UHF bands... hear FM, AM, CW and SSB* for listening excitement! Keypad or rotary frequency selection — with busy, clear and memory scanning — puts you in the scene sooner. And the CAT (Computer Aided Transceiver) interface doubles performance with multiple memory banks, automatic tuning plus customised scanning and searching. Cat D-2825

*SSB to 460MHz

WOW! $1199

The All Mode Receiver Yaesu's FRG-8800

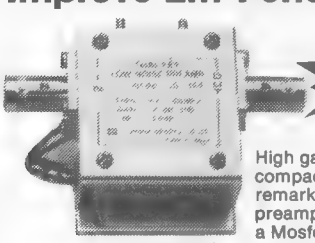


You won't find a better unit for the price! All the most wanted features are included PLUS some pleasant surprises: • 10 in-built memories • Digital frequency entry or standard knob tuning • Provision for an internal VHF converter • CAT (Computer Aided Transceiver) capability. Two exciting models to choose from:

FRG-8800 HF (150kHz-30MHz) Cat D-2820 $1259

FRG-8800 SW (2MHz-30MHz) Cat D-2821 $969

Improve 2m Performance!



Save $30!

High gain, low noise and compact size — that's the remarkable GaAsFET preamp... far better than a Mosfet for your rig. Covers 144-148MHz bandwidth. Gain: 20dB. Noise figure: 0.8db. VSWR: <1.5:1. With BNC connectors. Cat D-2956

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With Double Bonus to the value of $79.90 !!

It's a bargain so hurry while our limited stocks of the superb Yaesu FT-703R last! It's ideal for in the field or mobile action.

• Covers 430-440MHz • Squelch • Switchable hi/lo power • Standard repeater offset switch • VOX with optional headset • S/PO meter • Includes FNB-3 NiCad.

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Bonus #2: 70cm Yagi Antenna Kit (K-6305).....value **$29.95.**
That's $79.90 value — yours absolutely FREE! Cat D-3508

...Or for 2m action our latest economy Hand-Held

VALUE!

Amazing value for access to the full 800 channels in the 144-148MHz band. And for the low price you enjoy exceptional features:
• Repeater splits • Easy thumbwheel tuning • Built-in condenser mic • RF output: 1.5W
• Sensitivity: 0.5uV (20dB S/N). Cat D-3520

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B291

VHF UHF — an expanding world

Eric Jamieson VK5LP
1 Quinns Road, Forreston, SA. 5233

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR BANDS BEACONS

FREQUENCY	CALL SIGN	LOCATION
50.010	JA2IGY	*Mie*
50.060	KH6EQI	*Honolulu*
50.075	VS6SIX	*Hong Kong*
50.109	JD1YAA	*Japan*
52.013	P29BPL	*Loloata Island*
52.020	FK8AB	*Noumea*
52.100	ZK2SIX	*Niue*
52.150	VK0SJ	*Macquarie Island (Keyer)*
52.200	VK8VF	*Darwin*
52.250	ZL2VHM	*Manawatu*
52.310	ZL3MHF	*Hornby*
52.320	VK6RTT	*Karratha*
52.325	VK2RHV	*Newcastle*
52.350	VK6RTU	*Kalgoorlie*
52.370	VK7RST	*Hobart*
52.420	VK2RSY	*Sydney*
52.425	VK2RGB	*Gunnedah*
52.440	VK4RTL	*Townsville*
52.450	VK5VF	*Mount Lofty*
52.460	VK6RPH	*Perth*
52.465	VK6RTW	*Albany*
52.470	VK7RNT	*Launceston*
52.485	VK8RAS	*Alice Springs*
144.019	VK6RBS	*Busselton*
144.400	VK4RBB	*Mount Mowbullan*
144.410	VK1RCC	*Canberra*
144.420	VK2RSY	*Sydney*
144.430	VK3RTG	*Glen Waverley*
144.465	VK6RTW	*Albany*
144.480	VK8VF	*Darwin*
144.485	VK8RAS	*Alice Springs*
144.550	VK5RSE	*Mount Gambier*
144.565	VK6RPB	*Port Hedland*
144.600	VK6RTT	*Karratha*
144.800	VK5VF	*Mount Lofty*
144.950	VK2RCW	*Sydney*
145.000	VK6RPH	*Perth*
432.057	VK6RBS	*Busselton*
432.160	VK6RPR	*Nedlands*
432.410	VK6RTT	*Karratha*
432.420	VK2RSY	*Sydney*
432.440	VK4RBB	*Brisbane*
432.475	VK3RAI	*MacLeod, Melbourne*[1]
432.535	VK3RMB	*Mount Buninyong*
432.540	VK4RAR	*Rockhampton*
1296.171	VK6RBS	*Busselton*
1296.420	VK2RSY	*Sydney*
1296.480	VK6RPR	*Nedlands*
10300.000	VK6RVF	*Roleystone*

1. Ian VK3AQU, has written with more details of his beacon. The call sign has been corrected to VK3RAI. It is located at Macleod, a north-eastern Melbourne suburb, and has a power output of two watts (the licence allows for a maximum of seven watts). The antenna is a clover leaf and the mode, CW, with one minute of carrier followed by the call sign.

Ian would be interested to receive reports from those hearing the beacon, which would help determine its coverage. Reports to Ian Glanville, RMB 2139, Myrtleford, Vic. 3737, or he can be contacted on 3.650 MHz, Sunday mornings at 0000 UTC.

SOLAR FLARE

A letter from Chas VK3BRZ, sheds some more light on the huge solar flare last February, which resulted in many long distance contacts. Chas writes:

"Much has been written in the various radio journals, both local and foreign, concerning the solar flare of February 8, this year, and its effects on radio propagation. One aspect of this event seems to have been neglected: I refer to the high level of solar noise in the few days leading up to the flare.

"On the evening of Wednesday, February 5, Arie VK3AMZ, alerted me to the unusually high level of solar noise he was hearing on two metres. Sure enough, when I pointed my beam to the sun, the noise was very strong indeed. In turn, I called Daryl VK3AQR, and Bert VK3ZZX, who both observed the noise on two metres and six metres. Daryl also confirmed its existence on 70 cm. We all agreed that the level was around S7. This was about 7 pm local daylight saving time (0800 UTC). We continued to listen until, near sunset, the noise began to fade and peak with a period of 10 or more seconds (unfortunately I paid little attention to this detail) and gradually disappeared when the sun was well below the horizon.

"In the ensuing days, I made a special point of monitoring the sun in the mornings and evenings, the noise being audible at both times of the day, but becoming progressively weaker. By the evening of the seventh, the noise level had almost returned to the 'quiet sun' conditions. (Mornings and evenings were convenient because I could not alter the elevation angle of my antenna; I had to choose times when my antenna could 'look' straight at the sun).

"I should point out that I had not previously encountered this phenomena. Solar noise I could hear quite often but it had never exceeded 2 dB above the receiver noise floor. (FT-480R with VK5 preamplifier, antenna 20 element, four bay collinear array). While I realise the sun was unusually active, I did not, at this time, associate this activity with a solar flare. I did feel, however, that changes would occur in radio propagation and noted that HF had died.

"The date of the flare is given by the IPS as February 8, and this date coincides with that of the auroral VHF propagation in the southern parts of Australia. The peak period of solar noise on VHF however, occurred on February 5, some days prior to the flare and accompanying propagation and actually diminishing to almost undetectable by the time of the enhanced conditions. Could someone elaborate on how the date of the flare is actually determined? That is, at what stage is this kind of disturbance actually classed as a flare?

"I would also like to know if others observed this phenomenon (and perhaps did not recognise it at the time). In hindsight, it appears the enhanced VHF conditions might well have been predictable several days in advance. Needless to say I will be paying close attention to the sun in the future, and urge others with a similar interest to do likewise. These events are rather rare but extremely interesting from the point of view of the VHF enthusiast."

Thank you for writing Chas, and I hope your comments will keep the flames of interest kindled!

IC-551 NOISE BLANKER

The information I gave, in the September issue, of modifications to the noise blanker of the IC-551 obviously was gratefully received by a number of operators who have been plagued by power line noise in view of communications since received.

One such communication came from David VK3ADM, which gave additional information such that one would hope the final results would be similar to that already being obtained with the TS-600 noise blanker. The additional information is included for those wanting to achieve the ultimate in noise blanking of the IC-551.

David says; "The SEC have replaced poles, transformers, insulators and hardware, etc which reduced the power leak from S9 +30 dB to S7-8 on the IC- 551.

"a. The receiver was not realigned as I had completed this task six months prior, and the receiver specifications remained the same before and after the noise blanker was modified.

"b. I removed the top cover from the rig, pointed the beam at the noise source and proceeded to align L19 and adjust R65 with the noise blanker activated for minimum noise on the S-meter. Hence, the first problem was encountered. The power leak did not produce a stable enough noise source for a constant S-meter reading.

"c. SOLUTION: Wrap approximately two turns of insulated wire around a double insulated electric hand drill (plastic case type). Feed the end of the wire into the antenna socket of the IC-551 and lock the trigger on the drill to provide continuous operation. Adjust the number of turns around the drill until S9 is produced on the 551 with the RF gain set at maximum and the noise blanker off. Result — a stable noise source.

"d. Carefully align L19 and adjust R65 a number of times with the noise blanker activated until a minimal S-meter reading is obtained, note the reading; and

"e. Proceed to modify Q13 and R86 as detailed on page 37, September 1986 AR. Conduct set up and realignment procedure as indicated in sub-paragraph c.

"The figures listed below are indicative of the performance obtained (using drill as noise source);

"i. Before modification, noise blanker off, S-meter reads 9. Noise blanker on, S-meter reads 5; and

"ii After modification, noise blanker on, S-meter reads 2-3.

"When the antenna was reconnected and beamed at the noise source, the power leak was reading S8-9 +10 dB with the noise blanker switched off. With the noise blanker activated, the S-meter reading was 0. Peace and quiet on six metres at last!"

Thank you for the letter David, and the extra information given to ensure a worthwhile improvement in the noise problems of the IC-551. I shall try your noise source to fine-tune my IC-551 and hopefully this summer I will not need to replace the IC-551 with the TS-600 again — at least both rigs should be on a par.

All this, of course, makes one wonder why one manufacturer can produce such a superb noise blanker for six metres while another, with an equally good reputation for producing fine equipment, should install such a mediocre device! Even my old FT-101B has a superb noise blanker for use on power leak and with modern techniques, no quality rig should have to be put aside through inability to reject noise. I hope Icom will be reading these comments and do something about it.

OVERSEAS

CQ ham radio from Japan for August 1986 (via VK6RO) shows another station in China signing BY4RB and having a first contact on June 22, with JA6YMR. Later contacts were made to all JA call areas. Time was around 1530. Equipment used was a TR-9300 to a six element beam on an 8 metre boom and seven metres high. QSL to PO Box 413, Zhenjiang, China. Other stations from the same country include BY4AA, and BY1PK with operation usually around 50.110 MHz and often in CW.

The Japanese VHF operators have been having a lean time like we in Australia when it comes to exotic contacts. During June 1986, many contacts have taken place between Japan and HL1, 2, 4 and 5, all in Korea, and VS6 in Hong Kong. Apart from these areas, the Japanese operators have been amusing themselves listening to harmonics of shortwave broadcasters, namely, XSG on 50.748 which is a third harmonic of the original on 16.916.5 MHz and originates in China; UA-RADIO and BY-RADIO (USSR and China respectively) both originating on 7.230 and coming up on 50.610 MHz (and possibly one is jamming the other!), these are the seventh harmonics so the original signals must be very powerful! Chinese television comes up on 51.250 and Malaysian television on

53.750 MHz, and another commercial signing JOH appears on 50.180 MHz.

One supposes that being relatively close to other countries with exceedingly powerful transmitters, that harmonics will appear even if they are 60 to 80 dB down, especially if being received on first rate equipment with large beam antennas. I have had no reports of any of these stations ever being received in Australia.

My own schedule of listening and operating on the bands has been disrupted greatly of late. First the trip to Darwin reported last month, and since then, a trip has been made to Birdsville and Innamincka, but as there are no VHF operators in those areas, no visitations could be made.

Reports received however, indicate there have been spasmodic contacts on six metres between VK5 and VK2, while the usual VK5 to VK3 contacts have continued on two metres. I have received no reports of contacts across the Bight to Albany.

KNOW YOUR OPERATOR

Some years ago I ran a segment which gave details of some prominent (at the time) VHF operators and in some cases, included a photograph of the operator. It might be the right time to revive that segment. Last time I arranged it by personal invitation to those concerned to supply relevant information and in most cases, they responded. I would be pleased to hear from any VHF type who would like to pass on something about himself, the goals he has achieved including awards, and if possible, a photograph of the operator and/or antenna installation, etc.

Additionally, I would like to hear from more of you in regard to who you are working as it is becoming increasingly hard to give you news during the lowest part of the sunspot cycle. A number of people have been very faithful in keeping me informed but it would be great to hear from more of you. I rarely hear anything from VK4, VK6 and VK8. The *VK6 VHF Group Bulletin* helps to fill the gaps from the west, and the *The Propagator* tells me something about New South Wales, but otherwise I have to dig right to the bottom of the barrel to find something for you quite often.

THE ROSS HULL CONTEST

That perennial, the *Ross Hull Memorial Contest* comes up again in this column as I said it would in an attempt to muster continuing support for the Contest, particularly applying to the scoring and distance tables and the number of bands which might be used. If these do in fact become the Contest rules for this year, I hope all those with equipment on 52, 144, and 432 MHz will lend their support both in operating and swapping numbers, and most importantly, the submission of a log. If you do your original neatly in black pencil (this allows the use of a rubber for corrections) you can photocopy your log without the necessity of rewriting it. I have followed that method for a number of years and it works quite well, but the requirements for a legible log is first priority as far as the Contest Manager is concerned.

I hope to go out portable again this year. My wife has given permission as she believes home is the best place in the hot weather! I will be operational on 52, 144 and 432 MHz and look forward to having contacts with everyone on air and in particular any other portable stations. The period from 26/12/86 to 1/1/87 being one week, lends itself to portable operation. The Christmas festivities are over, all will have sobered up, and many people are able to get a few days break at that time, so it seems worthwhile to pack up the gear and go somewhere where you can get away from the power line noise, television interference, etc and enjoy some of the benefits from having a site which is probably better than your home station. I know I found an incredible difference operating portable last year from Meningie, when compared with my hill surrounded home site, especially for 70 cm. If enough were to go out it might warrant having a Field Day Contest run in parallel with the Ross Hull in subsequent years. Let me know if you have any ideas.

SPORADIC E CONTACTS

In AR, January 1986, I ran an article outlining what constituted long distance contacts and how at the moment Sporadic E medium was the means by which such contacts were possible, and at times of high sunspot activity, how F2 contacts were common. For the newcomers to the VHF bands, and six metres in particular, I would suggest this information be read again so you might have some understanding how such contacts are made. However, a brief recap here might be of some use.

In the main, six metre contacts via Sporadic E or Es for short, occur during the summer months and more particularly, during November, December and probably mid-January, after which contacts can taper off dramatically. Because they are sporadic they can nevertheless occur at any time.

Prime distances for first hop contacts will be around 2000 km (1200 miles) and double and triple hops will be multiples of these and less common. VK5 to ZL is a two hop contact. There seems some evidence to suggest that some contacts do "follow the sun" — ie as the sun makes its westerly trajectory across Australia (for the purist that means the earth's rotation!) then different areas open up for contacts. This seems particularly so when applied to stations out in the Pacific islands which seem more available during the early morning than later in the day. However, because these areas too are subject to the sporadic nature of the propagation, such contacts do occur at other times. Mostly therefore, if you want to work Noumea, it would be better to try during the mornings rather than later, and this applies to all areas out there.

Single hop contacts are usually the strongest with the level dropping in proportion to the extension of the distance. Under good Es conditions you will be surprised how strong the signals are and how only a few watts can be S9 at times at a 1000 miles or more!

In Australia we have a calling frequency of 52.050 MHz which is a frequency set aside for originating a contact and then moving to another portion of the band when contact has been established. Most stations will honour this arrangement and move off, particularly when the band is busy. However, you will find there are those stations who habitually use the call channel for contacts ignoring pleas from others to vacate it. I only hope newcomers will not fall into this habit. Sometimes you cannot avoid making a contact on that frequency, particularly if the station is a long distance contact, say out in the Pacific, and the call channel gives him the only chance at a contact as moving may put him under someone else. In this case, keep the contact very short and leave him to the multitudes. The call channel is very useful when the band appears dead as it gives stations in other areas a frequency to monitor, and if you give a call there from time to time, it is likely a contact will eventually result.

I would like to see more use made of the three second break between overs as this gives some other station a chance to be heard or come in with information which may be of value to all parties.

Most operating will occur within the first 100 kHz of 52 MHz. If you need to have a private contact with someone there is plenty of room further up the band where you will probably be left alone. CW will only occasionally be found on the band, mostly at the lower end, but is still very useful to complete a difficult contact. I remember working FO8DR in Tahiti, many years ago on CW — had I not done so I would not have worked that country as I have not heard a station from there since!

Generally speaking, the newcomer will find the VHF bands a pleasant place to have contacts and I hope you enjoy any time spent operating there. Incidentally, it helps when calling CQ DX to repeat you call sign many more times than you say "CQ DX" as that is likely to be read much easier than your call sign when the going gets tough and it is your call sign the other station needs for a contact.

SIX METRE STANDINGS

The next update of the Six Metre Standings will be in the February 1987 issue and new claims and additions or alterations need to be on my desk by December 15, if you want them included. Details required are the date of contact, time in UTC, call sign of station worked, country, mode, report sent and received, QSL sent and whether received. Split frequency contacts should be indicated, and please add your call sign and signature plus the date of your claim.

CLOSURE

Sporadic E contacts should be starting by the time you read this so here is hoping for another bumper year. Two metre activity will be uppermost in many shacks so there will be plenty of people looking for short skip six metre contacts.

Closing with two thoughts for the month: *It's not the difference between people that is the difficulty. It's the indifference.* And *We may not return the affection of those who like us, but we always respect their good judgment.*

—73 The Voice in the Hills.

SEE CONTEST COLUMN FOR FULL ROSS HULL MEMORIAL CONTEST DETAILS FOR 1986!

Cartoon courtesy *The Short Wave Magazine*, April 1986

"Well, it works O.K. on Top Band but it'll only do sausages . . ."

Contests

Ian Hunt VK5QX
FEDERAL CONTEST MANAGER
Box 1234, GPO, Adelaide, SA. 5001

CONTEST CALENDAR

NOVEMBER

1- 2	International Police Association Contest (Details this issue)
- 8	Australian Ladies Amateur Radio Association Contest (Rules September issue)
8- 9	European RTTY Contest (Rules August issue)
—15	AHARS National CW Sprint (Rules October issue)
15-16	Oceania QRP CW Contest
—22	AHARS National Phone Sprint (Rules October issue)
29-30	CQ WW DX CW Contest (Rules this issue)

DECEMBER

6- 8	ARRL 160 metre Contest
14-15	ARRL 10 metre Contest
—13	Ross Hull Memorial VHF Contest commences (Rules this issue)

JANUARY

— 5	Ross Hull Memorial VHF Contest concludes

I would also expect that during January, *73 Magazine* will run their usual series of World SSB Championship Contests. To date, I have not received any details for these contests. Should you be interested in them, I suggest that the rules published in *Amateur Radio* magazine for December 1985 may be worth your perusal. In the meantime, should I receive details I will publish them as soon as possible.

It is unfortunate that now and again, copies of rules do not come to hand as early as one would like and thus I have such a situation this month. I was not able to publish the rules for the CQ WW DX Phone Contest prior to this issue. I publish them now to cover the CW event which is held at the end of this month. The rules for the CW World Wide DX Contests vary little from year to year, therefore I trust that the publication of this information will be of value to you in the future.

CONTEST CHAMPIONSHIP TROPHY

I have a correction to make to the results of the CW category for the Contest Championship Trophy, 1985. In the results listed in the September issue of *Amateur Radio*, it showed that Jim VK2BQS, was the winner of this section. Now, I can tell you that Jim is certainly a very honest man and I am proud to claim Jim as a friend in amateur radio.

Following a telephone call, plus other correspondence from Jim, it has been decided that the winner of this part of the competition will now be declared as being **Lindsay VK5GZ**. Jim VK2BQS, drew my attention to certain facts which precluded him from rightfully being declared the CW section winner.

Lindsay VK5GZ, is certainly a worthy winner of the competition as he has over the years supported the various contests organised by the WIA. He is also a very keen CW operator and has certainly done his very best to popularise that mode of transmission. He has always shown his keen interest in Institute matters and has made many submissions to the VK5 Division on both Divisional matters and suggestions for Federal Agenda items. Our heartiest congratulations to you, Lindsay.

ROSS HULL MEMORIAL VHF CONTEST

The last two years operation in this contest has seen a very disappointing result in the way of entries. Efforts have been made to try and increase interest, but to this stage, to no avail. For yet a third year the rules have again been altered to try and encourage all those VHF operators out there to participate. I have already expressed my firm opinion that if this coming contest does not show an improvement in entries there will have to be a long hard look at the future of the Ross Hull Contest and its present format. It appears that there is perhaps hardly any interest at all. Quite some time ago now, I circulated a copy of a discussion paper regarding VHF/UHF aspects of contests. To date (end of September) little comment has been forthcoming. Maybe nobody really wants any VHF contests at all!

There has been some suggestion that this FCM actually wants to do away with the Ross Hull Contest, however I simply stand on my record in that I have done as much as anyone to try and breathe some real life back into the VHF contest scene. In fact, I rather feel that for the interest shown, I have put more effort into trying to maintain this contest than has ever been put into discussion on HF contests. No! I am neither against nor unskilled in the matter of VHF and higher frequencies. I do in fact, quite often work at frequencies up to around 25 GHz. (For the uninitiated that is 25 000 MHz). This I do in my professional work on a daily basis. So, I hope that these few statements may do just a little to refute the odd rumour or misunderstanding which may exist. I will however still maintain that the only measure that the FCM has of the success and interest, or otherwise, of a contest is by the number of entries submitted for the contest.

I now provide for you the rules for the 1986 Ross Hull Memorial VHF Contest, together with various comments dealing with the changes made.

Objects — Australian amateurs will endeavour to contact as many other amateurs as possible.
Period — From 0001 UTC, December 13, 1986 to 2400 UTC, January 5, 1987.
Exchange — RS/T plus three figure serial number beginning at 001 and increasing by one for each contact. When 999 is reached, a start is made again from 001.
Bands — 52, 144 and 432 MHz. Six metres contacts valid only between 52 and 54 MHz. Simplex contacts only; no cross band contacts.
Operator — Single operator only. One transmission only at one time.
Contacts — One contact per UTC day per band with each station.
Duration — a. Seven UTC days, not necessarily consecutive.
b. Two UTC days consecutive.
Modes — Any mode of operation may be used for any contact; eg CW, SSB, AM, FM, ATV, RTTY, SSTV.
Scoring — 52 MHz: up to 1000 km, two points; 1000 to 2000, one point; over 2000 km two points.
144 MHz: up to 500 km, two points; 500 to 1000 km, five points; over 1000 km, 10 points.
432 MHz: up to 500 km, four points; 500 to 1000 km, 10 points; over 1000 km, 15 points.

These scores are for Australian amateurs contacting one another on the Australian mainland and Tasmania.
Bonus — For every completed 10 contacts entered in the log book each UTC day, add a bonus of 10 points to the day's score.
Overseas Stations — Contacts from VK1-VK8 inclusive to VK0, VK9, P29, H44, FK, ZL and other Pacific and outside areas to be five points on 52 MHz; 10 points on 144 MHz and 15 points on 432 MHz.

Stations outside the Australian mainland and Tasmania contacting Australian stations will also score in accordance with the scale above.
Log Sheets — It is desirable that logs covering the complete period of the contest be submitted for cross-checking purposes. Clear, neat photocopies are acceptable. The following details must be shown:
Date and Time in UTC, Band, Emission, Station Worked, RS/T and Number Sent, RS/T and Number Received, Points, and Bonus. Each page must be numbered and totalled at the bottom.
Front Sheet — A Front Sheet must be attached to the log entries showing the following information in this order:
Call Sign, Section, Total of Daily Points with Bonus Points added to provide a total for the best seven UTC days. List the best two UTC days with daily score, bonus and two day total. List the bands on which operation has taken place.
Declaration — "I certify that I have operated in accordance with the rules and spirit of the contest." Name, address, signature and date.
Awards — A perpetual trophy is awarded annually for competition between members of the Wireless Institute of Australia. The winners name is inscribed on the trophy and the winner receives a suitable certificate. The entrant with the highest overall score in the seven day section will be the winner and their Division will hold the trophy for one year.

Certificates will be awarded to the highest scorer in each State for the seven day period and to the highest scorer in the two day section (one certificate only). No entrant may receive more than one certificate.
Submission of Logs — Entries are to be forwarded to the Federal Contest Manager, WIA, GPO Box 1234, Adelaide, SA. 5001. Entries must be received no later than Friday, February 6, 1987. Please endorse the outside of the envelope *Ross Hull Memorial Contest.*
Receiving Section — Logs for the receiving section must show the same information as for a transmitting log, except for the second number exchange. If both stations participating in the contest are heard, both may be claimed, but must be listed as separate entries on the log. Any scoring contacts may be logged with no limit to the number of times that one station can be logged.
Disqualification — The Contest Manager may disqualify logs which are illegible or improperly set out and do not conform to the rules laid down. See the General Disqualification Criteria as published in *Amateur Radio,* August 1984. Any station observed during the contest as constantly departing from the generally accepted codes of operating ethics may also be disqualified.
Ross Hull Memorial UHF Contest — As the bands 576 MHz and above have been removed from the 1986 contest, it may be desirable to hold a contest along similar lines as the VHF contest for the UHF region.

The FCM would appreciate feedback from those amateurs with the potential to operate on the UHF bands with a view to possibly arranging such a contest to run in parallel with the VHF contest. If sufficient interest is indicated, it should be possible to obtain a suitable trophy for annual competition.

Comments on the Rule Changes for the 1986 Ross Hull Memorial VHF Contest

1 There seems little doubt one of the main inhibiting factors for the submission of logs is the fact that there are quite a number of very active amateurs able to operate on six or more bands. Those without this facility feel it is a waste of time sending in logs to a contest in which they have no hope whatsoever of winning. By limiting the contest to 52, 144, and 432 MHz for the time being, it does provide an area where there are many operators, most VHF amateurs have 52 and 144 MHz and an ever increasing number have 432 MHz. In the future, it may be possible to expand the contest to include 1296 MHz, but for the time being it is limited to the first three bands.
2 The one point per contact irrespective of distance was not well received and certainly did stop a lot of participation in 1985. The 1986 scoring table takes care of this and rewards the efforts required to make long distance contacts. At the same time, the scoring table has been kept relatively simple. It has also recognised the value of stations from outside

Australia who are prepared to issue numbers in the contest and given such contacts a reasonable points score.

3 The bonus system of 1985 made it more worthwhile to chase prefixes than to have contacts with stations already on the bands in areas which may have already been worked. By giving a bonus after 10 contacts will ensure there is some incentive in working as many stations as possible.

4 A number of operators wanted no contacts under either 50 or 100 km, depending on their attitude. Whilst this seemed fair enough at first thought, it is not fair in a case where there may be a station say 60 km out of a city metropolitan area who is able to work all and sundry living in the city, but each city operator can only have one contact, whereas, if they can work at any distance, they do have the right to work across town and thus be on a more even score with the slightly isolated station.

5 Doubts were raised as to the need for the contest scoring to be taken over the whole three weeks. An operator is only able to spend whatever time he has available on the contest, if it be three weeks that is fine, but it may only be 15 days, etc. But if he takes the best seven days then he may stand as good a chance as the three weeks amateur and the very high scores he is receiving from the long time operator will not mean he will have no chance of winning as it did when it related to the full period. Even though a three weeks operator might have more chances than one with less operating time, if both are in fact working the bands on what could be said to be good days, then both have an equal chance of making the best scores.

6 Certificates: For the 1985 contest, a total of nine certificates were issued on the basis of a total number of 11 entries. (Only 11 entries for the whole of Australia in a National contest?). To my mind this approach seems to detract to a large degree from the value of a certificate. We will however, persist again this year with the approach shown above in the hope that more entries may be forthcoming. Perhaps looking at this aspect of things may help you to understand further some of my earlier comments regarding lack of interest.

INTERNATIONAL POLICE ASSOCIATION CONTEST

This contest is run on two consecutive days as follows:
CW: Saturday, November 1. SSB: Sunday November 2. 0600-1000 UTC and 1400- 1800 UTC.

The International Police Association Radio Club Contest is again organised by the German Chapter. Participation is by members and non-members in three classes: single operator, multi-operator and SWL. The same station may be worked on each band and mode for QSO and multiplier credit. CW and SSB should be scored separately.

Exchange — RS/T and QSO number beginning with 001. Club members will identify by including IPA and their State if in the USA. Non-members in the USA will also include their State.

Scoring — One point per QSO, five points if it is with an IPA station. Multiply the total by DXCC countries and USA States worked on each band with an IPA station.

Frequencies — CW: 3.575; 7.025; 14.075; 21.075; 28.075. SSB: 3.650; 7.075; 14.295; 21.295; 28.575. DX: 3.775; 3.800; 7.075; 7.100 MHz.

Awards — Certificates to the three highest scorers in each class and each mode. Contest contacts can be applied to the *Sherlock Holmes Award* and *Trophy.* (Requirements for these were not provided. I wonder if our Awards Manager has heard of these? FCM).

Mailing — Deadline for contest logs is December 31, 1986. They should be posted to Anton Kohten DK5JA, PO Box 40 0163, D-4152 Kempen 1, West Germany.

REMEMBRANCE DAY CONTEST

At present, I am extremely busy keeping up with sorting, checking and collating the logs which are pouring in for the Remembrance Day Contest. From a preliminary look at correspondence received with logs, it appears that this contest was, as usual, enjoyed by a large number of operators. I hope to have the results out much earlier than has been the case for quite a number of years and I also trust that not too many mistakes will be made by myself whilst dealing with the large volume of incoming logs and material. At this stage, I would to make several comments. It is apparent that the majority of operators do read the rules and put at least a little thought into the preparation of their entries. It is also apparent that some do not bother at all. I cannot understand why these few do not recognise the fact that HF and VHF are shown as completely *separate categories* in the rules and thus, it would be expected that *separate logs* should be submitted for each category. Likewise, that Phone and CW are *separate sections* and again *separate logs* are necessary. This also extends to the Front Sheet which is required. Life would be so much easier for a Contest Manager if the minority of operators would think just a little more about how the rules are worded. Just an extra three minutes spent on each of 10 logs sorting out such problems, caused by lack of thought or consideration, means an extra 30 minutes work by your contest manager on top of his other time. (And I can assure you that this "complaint" refers to more than just 10 logs, too!). In some cases, there is a complete lack of front sheets and declarations and in others, the writing is almost illegible. Yet again, there are instances where the entrant has obviously not had any regard to the nature of the item he has posted. Large envelopes or bulky packages naturally cost more to mail and this FCM is not prepared to pay out 45 to 50 cents-per-time to accept mail which has insufficient postage! In such cases, the items have been returned to the Post Office as per the instructions shown on the card accompanying such items. So ***please*** take that little bit of care in preparing and submitting your entries in contests. It will be beneficial to both of us.

Finally, just a little further comment on scoring and other associated matters. I have followed a policy that, where phone and CW are concerned, they are always entered into entirely different sections. Thus, it does not matter that the scoring value against each contact is exactly the same. CW operators compete against each other and phone operators do likewise. I could make the thing totally ludicrous, and artificial, by allowing 100 points for every CW contact. I simply ask you what would this achieve? This matter has been looked at and discussed at length with quite a number of operators. The way I have applied this approach has been consistent. In the case of the Remembrance Day Contest, it is necessary that this method be followed as with any other approach the results could become badly biased and against the whole purpose of the formula used to determine the winning Division in the contest.

Some operators have queried the dropping of the "Open" section in the RD. This was done for more than one reason. With the separation of the contest into two categories; ie HF and VHF, it was felt that sufficient sections would exist and that matters should be kept as simple as possible. (See note above. Some operators cannot follow even the simpler rules). Further, there is no bar to any operator entering into more than one section in the contest. If he wishes to do this he increases the number of logs entered on behalf of his Division. Such an approach also allows him to add to the Divisions score, provided he works the minimum (10) contacts for the mode concerned. This approach is considered to be simple and fair to all concerned. Some future contest manager may see fit to vary this approach. If you have any comments to make on this subject, perhaps you may wish to air your views by writing me a letter.

I would also like to take the opportunity of pointing out one more aspect regarding my position. The 1986 Remembrance Day Contest will be the last of that particular contest that I will be fully responsible for. I will however, be responsible for the compilation of the rules for the 1987 contest, whilst my successor, as FCM, will take over from that point. This being the case, I feel that it would be most unfair for the 1987 contest to be run under rules any different to those which currently exist. I therefore propose that the rules for the 1987 Remembrance Day Contest should remain as they were for 1986. I would also like to think that to a greater degree, the rules for all of our WIA sponsored HF contests will, by now, have become stabilised and that they may stay that way for some time to come.

So, for now, I again wish you all the best in your activities.

—73 de Ian VK5QX.

1986 CQ WORLD-WIDE DX CONTEST

Phone was on October 25-26.
CW: November 29-30.
Begins 0000 UTC Saturday . . . Concludes 2400 UTC Sunday.

Objective — For amateurs around the world to contact other amateurs in as many zones and countries as possible.

Bands — All bands, 1.8 to 28 MHz, except for WARC bands.

Types of Competition —

1 Single Operator (single band and all band). Single operator stations are those at which one person performs all of the operating, logging, and spotting functions. The use of DX spotting nets or any other form of DX alerting assistance places the station in the Multi-Operator category.

2 Multi-Operator (all band operation only).
a. Single transmitter, only one transmitter and one band permitted during the same time period (defined as 10 minutes). Exception: One — and only one — other band may be used during the same period if — and only if — the station worked is a new multiplier. Logs found in violation of the 10- minute rule will be automatically reclassified as multi-multi to reflect their actual status.
b. Multi-Transmitter (no limit to transmitters but only one signal per band permitted).
c. All transmitters must be located within a 500 metre diameter or within the property limits of the station licensee's address, whichever is greater. The antennas must be physically connected by wires to the transmitter.

3 QRPp (single operator only). Power must not exceed five watts output. Stations in this category will be competing only with other QRPp stations for awards.

4 Team Contesting. A team consists of any five radio amateurs operating in the single operator category. A person can be on only one team per mode. A team **must operate** from two continents. Competing on a team will not prevent any team member from submitting his personal score for a radio club. A team score will be the sum of all the team member scores. SSB and CW teams are totally separate. That is, a member of an SSB team can be on a totally different CW team. A list of a team's members must be received by November 15 for CW. Send a list to *CQ* Att: Team Contest, 76 North Broadway, Hicksville, NY 11801. USA. Awards will be given to the top teams on each mode. A list of a team's member's scores plus the total team score must be submitted to *CQ* by the normal contest log deadlines.

Number Exchange — RS/T report, plus zone; ie 57905.

A station in a zone or country different than that indicated by its call sign is required to sign portable.

Multiplier — Two types of multiplier will be used.

1 A multiplier of one for each different zone contacted on each band.

2 A multiplier of one for each different country contacted on each band.

Stations are permitted to contact their own country and zone for multiplier credit. The *CQ* Zone Map, DXCC country list, WAE country list, and WAC boundaries are standards.

Points —

1 Contacts between stations on different continents are worth three points.

2 Contacts between stations on the same continent but different countries, one point.

3 Contacts between stations in the same country are permitted for zone or country multiplier credit but have zero point value.

Scoring — All stations: the final score is the result of the total QSO points multiplied by the sum of your zone and country multiplier.

Example: 1000 QSO points times 100 multipliers (30 Zones plus 70 Countries) equals 100 000 (final score).

Awards — First place certificates will be awarded in each category listed under Type of Competition, in every participating country and each call area of the United States, Canada, Asiatic USSR and Japan.

All scores will be published. To be eligible for an award, a Single Operator station must show a minimum of 12 hours operation. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award only. If a log contains more than one band it will be judged as an all-band entry, unless specified otherwise.

In countries or sections where the returns justify, second and third place awards will be made.

All certificates and plaques will be issued to the licensee of the station used.

Trophy winners may win the same trophy only once in a two-year period. In the event that the same station wins the World Award in the same category in two consecutive years, a special *CQ* Magazine Championship plaque will be awarded the second year. The sponsored trophy in that category will then be awarded to the second-place contestant in that category, if the returns justify the award.

A station winning a World Trophy will not be considered for a sub-area award. That trophy will be awarded to the runner-up of that area.

Club Competition —

1 The club must be a local group and not a national organisation.
2 Participation is limited to members operating within a local geographic area defined as within a 275 km radius from the centre of the club area (except for DXpeditions especially organised for operation in the contest.
3 To be listed, a minimum of three logs must be received from a club and an officer of the club must submit a list of participating members and their scores.

Log Instructions —

1 All times must be in UTC.
2 All sent and received exchanges are to be logged.
3 Indicate zone and country multiplier only the *first time* it is worked on each band.
4 Logs must be checked for duplicate contacts, correct QSO points and multipliers. Submitted logs must have duplicate contacts clearly shown. The *original* log may be requested by the Contest Committee if further cross-checking of the log is necessary.
5 Use a separate sheet for each band.
6 Each entry must be accompanied by a summary sheet showing all scoring information, category of competition, contestant's name and address in BLOCK LETTERS and a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.
7 Sample log and summary sheets and zone maps are available from *CQ*. A large self-addressed envelope with sufficient return postage or IRCs must accompany your request.
If official forms are not available, make up your own, 80 contacts to a page on 215 x 279 mm paper.
8 All entrants are required to submit cross-check sheets for each band on which 200 or more QSOs were made. All other entrants are encourages to submit cross-check sheets.
9 Duplicate contact penalty: up to one percent — three additional contacts removed; one to three percent — 10 additional contacts removed; over three percent is grounds for possible disqualification.
10 QRPp stations must indicate same on their summary sheets and state the actual maximum power output used, with a signed declaration.

Disqualification — Violation of amateur radio regulations in the country of the contestant, or the rules of the contest; unsportsmanlike conduct; taking credit for excessive duplicate contacts; unverifiable QSOs; or unverifiable multipliers will be deemed sufficient cause for disqualification. (Incorrectly logged calls will be counted as unverifiable contacts).

An entrant whose log is deemed by the Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. If an operator is disqualified a second time within five years, he will be ineligible for any *CQ* contest awards for three years.

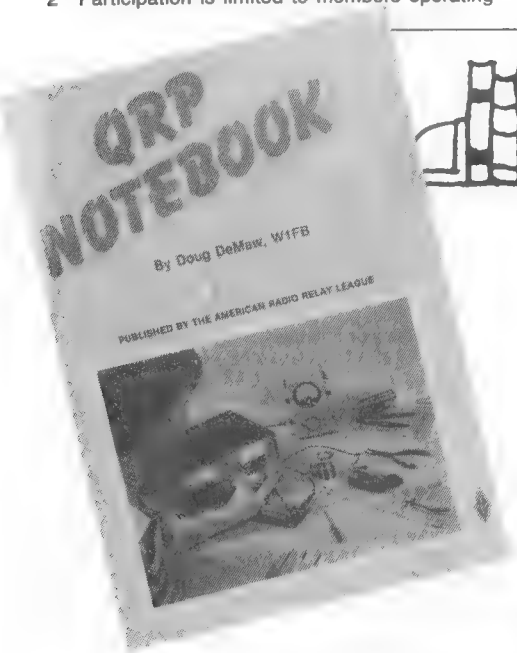
Actions and decisions of the *CQ* Contest Committee are official and final.

Deadline — All entries must be postmarked **no later** than December 1, 1986 for the Phone section and January 15, 1987 for the CW section. An extension may be given if requested. Indicate phone or CW on the envelope.

Logs to be Forwarded to — CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

Book Review

Evan Jarman VK3ANI
Technical Editor



QRP NOTEBOOK

by Doug DeMaw W1FB & published by the ARRL

Doug DeMaw was formerly a technical editor of *QST* and a co-author of one of the best books ever written for the radio amateur[1].

QRP Notebook, as the author noted in his preface, follows his preferred style of writing; plain language. However, his reluctance to use photographs and "fancy diagrams" is lamented by at least one reader. This book has chapters devoted to receiving, transmission, transceivers, accessory gear and a workshop.

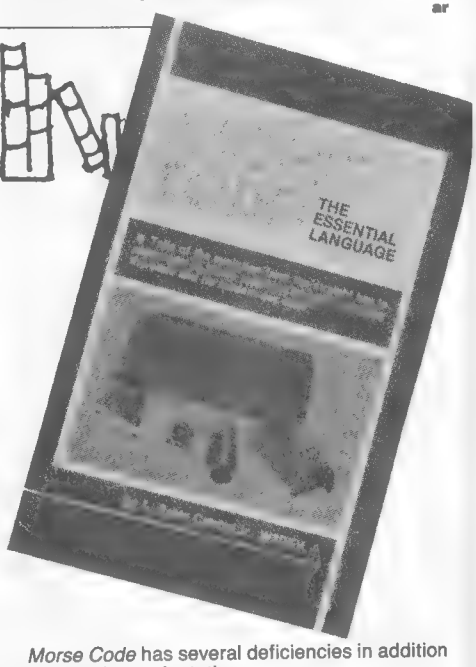
In navigating between simplicity and complexity, the author has missed the mark. Whilst the description of the theory behind the practical work is simple, the information required for construction is insufficient. Conversely, the level of theory does not match the constructional ability expected. No PCB designs are included, indeed the author expects the reader to construct the various projects from schematic diagrams. These PCB layouts, for most constructors, are essential and it is hoped that these are not considered to be "fancy diagrams."

For a beginner, and I showed it to others, the book was confusing. The greatest complaint was the lack of photographs. All wanted to see the completed article; a picture of what is being aimed at!

The author has attempted to economise in order to produce the book. I see it as a book that was produced to suit a budget instead of satisfying a need.

His previous effort[1] is still highly recommended.

Reference 1 — Wes Hayward and Doug DeMaw; "Solid State Design for the Radio Amateur" — American Radio Relay League.



MORSE CODE: The Essential Language

By Peter Carron Jr, W3DKV & published by the ARRL

Morse code, by its nature, does not lend itself to description in a book. It is something that most people can only appreciate from experience.

This book only reinforces this belief; I love Morse code, but I do not like the book! To me it has only a superficial description of the facets of Morse code and lacks much of the substance.

Morse Code is written for the American market and many of the procedures, frequencies and equipment described, do not translate well to Australian conditions.

The book starts with some of the history of code development after justification of the code's existence. It then describes the code (both International and American Morse), and describes some techniques used to learn it.

Operating equipment, handling of emergency calls, as well as a look into the future complete the book.

Morse Code has several deficiencies in addition to its American orientation.

In the history section, the Vail family received very short mention, when Alfred Vail did more work on the code than most credit him for.

Key construction and operation is for Americans and most operators in Australia would oppose what is described. I recommend that this section is ignored.

There are other criticisms, but these are minor. They are things such as the definition of a word; the book defines a word as any five letter group. Usually, for speed considerations, a word is either *Morse* or *Paris,* as both have the same length. Also, the use of QN as internationally accepted is wrong. By example, QNH does not mean that your net frequency is high, it is an adjusted barometric pressure used mostly for aviation and meteorology.

I enjoyed reading the history of Morse Code, but as a whole, I can find little to recommend in this book.

Electro-Magnetic Compatibility Report

Hans Ruckert VK2AOU
EMC REPORTER
25 Berrille Road, Beverly Hills, NSW. 2209

The community, and radio amateurs especially, are still suffering from electro-magnetic compatibility problems, as predicted by the writer 30 years ago. We are still waiting for EMC standards for appliances, backed by the new communications legislation. We hope that both will be at least as effective in protecting appliance and transmitter users, as has already been the case overseas for a number of years.

Please tell us your EMC appliance problems in cases where manufacturers of broadcast, television, video recorders and computers were willing, able and successful in improving their products. They deserve our appreciation and gratitude. The interesting cases will be published in AR. We can all learn from others' experience. For a start, let me briefly mention some of mine.

DEFINITIONS

TVI: Interference to television reception by illegal radiation.
TVA: Television reception is Affected by legal radiation due to insufficient (perhaps illegal) immunity, or selectivity, or too great susceptibility.
ITV: Interference to radio reception by (perhaps illegal) radiation from the television set.

1. THE HOPELESS, UNFORTUNATELY TYPICAL, CASE

Neighbour X knocks at the door one evening.

VK2AOU — Who is there please?
(No reply by neighbour).

Neighbour X (Pointing at VK2AOU and shouting) — You are causing interference to my television!

VK2AOU — I am sorry that you have this problem with your television. Please come inside, and see that my transmitter does not affect my television or video recorder!

Neighbour X — I am not interested!

VK2AOU — My transmitter does not cause interference. It is operated according to the legal requirements of the licence granted by the DOC, and was checked by Radio Inspectors.

Neighbour X — I am not interested!

VK2AOU — If you give me your name and address, I may be able to help you by attaching a filter to improve the selectivity of your television. Or we could contact the Service Department of the manufacturer, who may be on the list of those who are willing to assist customers.

Neighbour X — I am not interested. I will complain to the Post Office.
(Neighbour leaves).

2. THE WELL-INFORMED, FRIENDLY NEIGHBOUR

Dennis came one day, saying, "I am sorry to tell you that my television is not selective enough. I can see lines when you transmit. I know this problem from the UK. If you could perhaps make a high-pass filter? Drop it in my letter box. I can install it myself."

That fixed it. *** About 10 years later he came again, grinning, and said, "Thanks for the filter. My new television does not need one. Here it is. You can give it to a less lucky neighbour."

The radio amateurs' life would be easy if all neighbours with EMC problems were like Dennis!

3. LATER TELEVISION MODELS ARE NOT NECESSARILY BETTER

A friendly neighbour apologised to tell me that he had recently experienced TVA. I went to see his television set. There was an older television set, which was not affected by my transmission, and on top stood a new model of the same brand, which *was* affected. This made it clear that the new set would not comply with EMC immunity standards as they have applied in West Germany for years, making import to that country illegal. So the inferior television set is sold in Australia to uninformed customers. Since the well-known television rental and sales firm was on the "Assist List" compiled by VK3QQ, I wrote a letter to the service department explaining the situation, asking the neighbour to counter sign the letter. I have not received a reply, nor did I get any further complaints. High-pass and mains-line filters did not help. The shielding of the filters could not be earthed effectively, because there was not much of a metal chassis.

4. THE HELPFUL GRAETZ COMPANY

A neighbour (the lady was from Hamburg, the husband was Australian) told me that my transmitter affected their latest model high class Graetz television set from West Germany. All my efforts with high-pass and mains-line filters, coaxial feeder and balun (which I bought) were in vain. They phoned the importer's service department several times, and I too wrote to them. We never received an answer. I wrote to Graetz in West Germany, and received a very friendly letter 10 days later. They stated that their television set incorporates the latest design features to avoid TVA problems. They were surprised and sorry that we had any problems. They said further, that two of their service technicians were on an Asia-Australia training tour, and would soon be in Sydney to train local service people. They would arrange for these experts to attend to our complaint. Three weeks later, after half and hour of tests, they had fixed it free of charge. They did not say what they had done. This was in December 1976.

5. THE TELEVISION SERVICE MAN

Our neighbour next door has a bargain television set (VHF only), which is not only affected by my legal transmission on 14 MHz, but also causes severe interference (ITV) due to a strongly radiating line- frequency oscillator. About every 15 kHz a 4 kHz wide noise band of S7 signal strength is radiated, often making it impossible to have QSOs with less strong stations from the south-east of Europe on long path. There is an Australian standard (the same as in DL) specifying the permitted maximum radiation from television sets. My own Kreisler set is clean! The bargain set had been bought from a firm which was also on the EMC "Assist List", (AR, March 1982).

The neighbour called the service man, who told her to write to the DOC to have my transmitter shut-down, so she told me later. Having been informed by me on EMC, she did not follow his proposal. The high-pass filter the service man brought was absolutely useless, even when I asked him to install it directly at the tuner. My home-made filter brought some improvement. A coaxial cable 2x1 turn transformer at the antenna terminal helped too to some degree. Earthing the feeder braid to a water pipe, where the feeder enters the house at floor level helped too. So did a 30 degree antenna direction change. Hearing the line oscillator tells me when to use low power (100 watt PEP maximum), or to turn the beam away when possible.

I invited the service man to see that my television was not affected, and I showed him the transmitter, attached low-pass filter, and that no RF was on the mains cable or outside the PA enclosure. I gave him a lecture on EMC and showed him my 10 cm thick folders containing EMC papers and collected publications on TVA and ITV going as far back as 1952. I also mentioned the above-mentioned cases. He thanked me and appeared converted. I hope he won't automatically blame radio amateurs in future.

These five cases clearly show the situation in Australia and what should be done and by whom to overcome EMC problems, education of the public by the DOC (as in DL) and electronic magazines (not only by AR). Adequate legal EMC standards, followed by compliance and service with technical know-how by the industry, would do the job.

6. LOEWE OPTA GmbH WRITES IN *CQ-DL* MAGAZINE (translated by VK2AOU)

We propose the following procedure:

a. It has to be determined that the unwanted effect is not caused by an aerial pre-amplifier (wide-band pre-amplifiers are illegal in West Germany. They must contain band-pass circuits for the television ranges).
b. The television antenna must have a coaxial feed line, and the signal level must be sufficiently high to allow "snow-free" picture reception.
c. It is desirable to have the case investigated by the appropriate Postal- Department Service (there are RI teams in over 70 towns). A copy of the report should be sent to us. If this is not possible, all relevant details of the TVA case should be made available to assist us. If the problem persists after complying with the above conditions, one of our service technicians will be asked to attend to this job and attempt to fix the television at the owner's location. In especially difficult cases the set will be sent by the dealer to our factory, and the individual set modifications will be carried out in our R and D department laboratory. In this case too, no charge will be made. Please inform the members (55 000) of your club in the appropriate manner, so that in the case of TVA help can be rendered to appliance owners and radio amateurs.
Loewe Opta GmbH.

THE HELPFUL *GRUNDIG* COMPANY (translated by VK2AOU from *CQ-DL* magazine 10/1977)

A colour television set, which had been bought in July from the *Grundig* Company (Europe's largest electronic appliance manufacturer) showed TVA in the picture if the transmitter amplifier was used (750 watts maximum permitted). The distance between the transmitting and television antennas was four metres. The case was investigated without calling the Post Office radio inspector. The details were submitted to the *Grundig* company in Nuernberg. I received within two weeks, without "red tape" and free of charge, a high-pass filter, a RF separation transformer (stops RF on the coaxial braid from bypassing this shield) and a mains-line filter with installation instructions. The mains-line filter cured the problem. Holes and space required to install the filter were already provided on the chassis. (Yes, there was a chassis, not just PC boards!). DK1RV, Kreuztal, West Germany.

Court actions would have been a waste of time, money and would have caused bitterness in all these cases, compared with the understanding and able help by the appliance manufacturers.

8. THE HELPFUL RADIO INSPECTORS (they were radio amateurs too)

QST and *CQ-DL* magazines reported several years ago a difficult-to-trace source of TVA. Several attempts and tests by two radio inspectors, with excellent equipment, resulted in

the discovery of a hidden "passive harmonic generator" corrupting a clean amateur transmitter signal. A wide-band antenna pre-amplifier had been disconnected from the power supply (as it, the illegal wide-band type, was no longer required). But it was still connected to the television antenna. The harmonic free amateur signal was picked up by the television antenna. The first transistor of the "cold" pre-amplifier acted as a diode (a non-linear device), rectifying and distorting the clean sine wave signal, thus producing a wide range of harmonics. Harmonics which coincided with the selected television channel on the attached television set, or any other nearby television set via re-radiation, were selected by the pre-amplifier and television set. Removing the unused pre-amplifier solved the problem.

Again, it had been wrong to blame the radio amateur.

We will look next time at the circuit of a 10 year old television set, which includes several features allowing achievement of a very high degree of EMC (immunity to unwanted signals). Readers may compare it with their own television set circuit to see the difference (if any) in design to achieve EMC.

It seems, that the radio amateur's life especially was not meant to be easy — but interesting!

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AR86

Australian Ladies Amateur Radio Association

Joy Collis VK2EBX
PUBLICITY OFFICER, ALARA
Box 22, Yeoval, NSW. 2868

It was a pleasant surprise when, on a regular sched with an old friend, three more friends I had not spoken to for some considerable time, broke in to say hello.

That is one of the great things about amateur radio — the friends one makes along the way, whether in Australia or overseas. Perhaps we will meet some of them one day, perhaps not. The bond of friendship is there just the same.

I like to think ALARA members share this bond of friendship, even though it would be virtually impossible for us all to meet together, and even though our circumstances, interests, etc may be widely different.

The first ALARA Get-Together held in September 1984 at Mildura was an outstanding success. Another such Get-Together is planned for 1987. Details will be available early next year.

ALARA CONTEST

The ALARA Contest will be held from 0001 UTC, Saturday November 8, to 2359 UTC, Saturday November 8. Contest rules were in September AR and the Membership List, July AR.

We are hoping for plenty of competition among novice YLs (not necessarily ALARA members) for the *Florence McKenzie CW Trophy,* (featured October AR). Remember, only five ALARA contacts needed to qualify, or eight and a third OMs. (The third could be a little tricky!). If last year is anything to go by there will be plenty looking for you, and anxious to give you those all-important contacts.

Hopefully, this years contest will be the friendly, enjoyable event it has been on previous occasions. Please join us, even if you can only spare a short time to get on air, and if the washing remains piled in the laundry, the dishes in the sink, and the house in a mess, at least you have a good excuse!

Last year we were very pleased that so many OMs showed such a keen interest in our Contest, and hope for plenty of OM participation this year also.

ALARA COMMITTEE

There is one alteration to the ALARA Committee (September AR). The Sponsorship Secretary is Gwen Tilson VK3DYL.

Jessie VK3VAN, has filled this position since 1983, and was ALARA Secretary prior to that. Out thanks to Jessie for all the work she has put into ALARA over the years.

ALARA NET

The ALARA Net on Monday night is still well patronised, in spite of QRN, QRM, and everything in between, plus the difficulty of finding a clear frequency on 80 metres, a not uncommon problem.

Mostly a little patience pays off, and our Monday night nets are an enjoyable occasion.

Even in this day and age I occasionally speak to an OM who expresses surprise at hearing a YL voice on the air. (Where have you been, gentlemen?).

I suppose it is only in recent years that YLs have become more commonplace, and probably were something of a rarity except as suppliers of food and clean-uppers afterwards.

It might be interesting to know what really did start some of our ladies on the road to amateur radio.

This was my experience:

We were living miles from anywhere in a place seldom visited except by bemused travellers who had taken a wrong road and wondered where on earth they could possibly be.

The farmer who owned the property had CB sets in his house, tractor and truck, (in the days when they were barely legal), which proved a very useful form of communication, and it was not long before the OM had one of his own.

For a while I refused to have anything to do with it, but as OM Dan spent more and more evenings with this new contraption, I decided if I did not beat him I might as well join him, and was highly delighted to make my first contact, in Western Australia.

Somehow the rest of Australia seemed a lot closer after that.

Not long after my introduction to CB, we shifted to Yeoval. An amateur radio class started in Wellington, which our eldest son was attending.

I could not get into Wellington to attend the classes, but it sounded interesting, so I obtained the WIA address and sent away for the Novice Kit. What I knew about electronics at that time could have been written on the back of a postage stamp, and it took much study plus pages and pages of written notes before I felt confident enough to try the theory.

CW practice was achieved with my son's help; we each recorded cassette tapes at approximately five words-per-minute, and swapped them, which helped us both in sending and receiving.

To do the Novice Examination, we had to travel to Wagga, some considerable distance from Yeoval, but the nearest available venue at the time. When we arrived at the examination room there were 40 OMs — and me! I think if I had been on my own I would never have summoned up the nerve to go in, but fortunately son and I both passed.

Once again it was back to the WIA, this time for the AOCP Correspondence Course.

It took four attempts at the AOCP Theory, this time thankfully at a local post office, and on my own except for the third attempt, when I was joined by an earnest young man who finished the paper in half the time, and did nothing for my self-esteem by telling everyone afterwards, how easy it had been. (He passed, I didn't!). However, the fourth attempt proved successful, and the CW later in the year finally gave me that elusive "Piece of Paper." What a terrific feeling!

That is all for this month. I look forward to catching up with everyone in the ALARA Contest, and may we have good propagation this year.

—73, 33. Joy VK2EBX.

Try This!

SWR COUPLER FAILURE IN FL2100Z

Den Smith VK5LS
49 Johnson Parade, Blackwood, SA. 5051

The failure of the 10 pF trimmer capacitor (TC201 in the coupler unit board (PC-2056A) of the Yaesu FL-2100Z will result in the destruction of almost all other components on the board.

If such damage does occur, and the components need replacing, a suitable air-spaced variable capacitor to replace TC201 may be difficult to locate.

If this is the case, it appears that operation without the trimmer is possible without apparent effect on the performance of the system.

TECHNICAL MAILBOX

VK3CMC . . . Box Hill, Vic

Craig raises the question of what is the reason for the change in paper and print quality in our magazine (and other electronic magazines), that has occurred in recent months. He notes that, under humid conditions, the ink tends to smear and, in the case of the Call Book, frequent running of the finger down the listings tends to obliterate or smear the print.

Naturally, when the matter was raised at our Technical Publications Group meeting, plenty of suggestions were instantly tendered. We all recognise that AR is widely read, and in some unusual places, but it was considered that reading it in the shower was taking things a little too far! ! !

After the frivolity died down (it certainly was a change from everyone trying to upstage each other picking the most "typos"), the question was posed to our tireless and unsung typesetters, jack-of-all-trades, Betken Productions.

Well, it appears to be just a case of economics and, in part, is a reflection on our times. Paper is most expensive and in not using the finest available, getting the right ink combination is quite an art. You will have noticed that we have opted for a whiter paper which improved the readability and picture quality. However, as I write this, we are caught up in an on- going saga. Due to the recent fire, (refer August AR), we are back to another group of publishers. Be patient with us until Betken cajoles, badgers and "trains" the new people! Yes we know about it and we are doing our very best . . .

Actually, it is all a cleverly arranged plot to sell more Call Books! ! !

VK3 . . . Frankston, Vic

"The transformer grunted, a bright flash came from the PA cage, a whiff of smoke, accompanied by a big bang. As the lights faded, an expensive smell wafted into my nostrils . . ."

Arrh . . . it sure gets the adrenalin flowing, Bob. Strange how seemingly simple tasks, like replacing the final PA tubes in your transceiver or linear amplifier, can lead to such turmoil. Well, is that strange? Let us go back over what most likely happened and put forward some suggestions that may well save you such exciting drama!

Firstly, those new tubes, which you practically had to take out a second mortgage to obtain, may not be as "new" as you were led to believe. Many of the types obtained now-a-days are not exactly a daily production-line product and most likely have been sitting around on the shelves for several years. Don't get me wrong, they are not like tomatoes and deteriorate completely whilst on the shelf, but a few simple precautions may go a long way in ensuring their extended life span. In fact, I have used "brand-new 1945 4CX250Bs" without any noticeable changes to their original design characteristics. However, a few precautionary procedures are necessary.

Here are a few basic tips that may help protect your investment without blowing your budget, or your house fuses. I do not wish to go too deeply into the subject of tube conditioning as employed by the broadcasters, as such detail is beyond the scope of this column, but if any readers wish to write up the subject we would certainly like to publish such an article.

Vacuum tubes, when transported, are sometimes likely to shed particles of cathode material, or in some cases, through less than perfect manufacturing techniques, have material "rolling around" inside the envelope. As we all know, Murphy's First Law of Vacuum Tubes predicts most accurately that such particles will be conductive and reside in the place most likely to cause the most damage; eg between grid and screen, or grid and plate. Tubes left for long periods without use are prone to develop cathode poisoning.

Many readers will recall the *Avo Valve Checker* which was most common in seemingly recent years. (All service people seemed to own one of these vital pieces of equipment). Apart from being able to accurately check the valves, this device could be pressed into service to remove some internal shorts and act as an ad hoc valve conditioner. At least you could determine if shorts were in evidence before you plugged the tube in.

Well, as we all do not have one of these at hand, one approach is to delve into the junk box and try to find a filament transformer and a valve socket. If this attempt draws a blank one may stare ruefully into the rig and contemplate taking the chance . . . All is not lost, let us use the rig.

The first objective is to apply filament voltage only and let the tubes "stew" for a couple of hours, measuring inter-electrode resistances whilst the filaments are on and again when the tube has cooled.

Okay, now let us go about this methodically to avoid risk to life and rig. If the rig is one of the "common garden variety" (FT101, TS520, etc), you will have your plate and screen voltages coming from a single rectifier via a single high voltage winding. The latter voltage is generally derived from a screen dropping resistor. Also, you will have a bias supply. Study the circuit thoroughly and become familiar with the way the voltages are derived. If you are working with a linear, then the same naturally applies, but you may not have the extra screen with which to contend!

It goes without saying — but I will say it — you should first disconnect the power cord from the mains socket. After you have removed the covers and gained access to the PA cage take an insulated screwdriver and short the plate capacitors to ground, the other side of the parasitic choke right back to the HV feed-through. Turn the rig over and do the same thing at the grid and screen pins. Finally, short out all the electrolytics. It is certainly not unusual to run across the bleed resistor being open-circuit. It is a good time to check this now!

Before removing the tubes, take a vacuum cleaner and blow out all the dust from the PA compartment, fan and underside. (This is a job which is best done outside). Remove the valves and repeat (you didn't blow all the dirt into the sockets, did you?). Next, inspect all the components for excessive heating, tell-tale arc-overs, etc. Pay special attention to the neutralising capacitor as dirt in here will surely cause a flame-out of significant proportions. Clean all that you can with adequate quantities of isopropyl alcohol using a tooth brush and clean cloth. If something does not look right, remove it for closer inspection. This is the time to spend a little time to make absolutely sure all is well as it is probably safe to say that the covers have not been removed for some time.

The next step is to disable ***and make safe*** the HV supply and bias supply. ***Disconnect the AC feed to the rectifier and not the DC output.*** Failure to do this may cause the voltage to rise and exceed the voltage rating of the electrolytics which also would guarantee to liven up proceedings! This is also a good time to check the fuses. Ensure that they are of the correct rating and not, as in Bob's case, the mobile replacement DC fuse (20A) installed in the mains feed! (The pedigree of the previous owner of his rig was somewhat questioned).

Now plug in the new bottles and, with all safe, apply the filaments. Let them run for a couple of hours and judiciously measure for any electrode shorts. Try all combinations. Let the rig cool and repeat the measurements.

If you have the misfortune to find a short and the tube is not under warranty it could be worth a try by "flashing" the offending short across a low voltage, high current source, viz one cell of a car battery. A drastic step, but if approached with utmost care, can restore the tube if you are lucky — it is worth a try.

Having satisfied yourself that things are in order, reconnect the supplies. It pays to place the HV tap at the lowest voltage for a while until you are sure things are all well. Before buttoning it all up, it also pays to have a look at the driver coupling capacitor. Some of these little beasties have been known to fail with catastrophic results. The PA tubes do not appreciate 250 volts on their grids! The solution — replace them with two of the same voltage rating, but twice the capacity and wire them in series.

Now turn on the rig and let it thoroughly warm up. Turn off the VOX and wind-off the AF gain. In some cases, also turn down the drive control. The next step could be the re-neutralising of the final. Here you should read your manual and follow accordingly. There seems to be many different ways manufacturers choose to carry out this procedure, many of which fall into what I consider somewhat suspect! Well, whichever way you have to go, it is highly recommended that you check your neutralisation, but remember to readjust your bias for correct standing current as soon as you reach the stage of keying on the transmitter. Finally, keep your drive as low as possible for a day or so before running things flat-chat. Treat the new tubes like a new car — don't thrash them first-off (or ever for that matter!).

Well, that's about it. Many of you may feel that it is "old hat" but there are newcomers among us that may not have known the simple steps as explained above. Certainly, there is a lot more to it and, as those who have been through the tedious tasks of recycling and de-barnacling expensive tubes will testify.

Finally, I hope Bob has been able to locate a replacement transformer or managed to get the old one rewound and by now has it back in place.

To conclude this month's *Mailbox*, a couple of things that I encountered in my shack during the last month which may help someone else.

THE CASE OF THE HIGH SWR

Living in Melbourne, need I say that it was pouring with rain at the time and, whilst checking Sun Noise on 432 MHz I observed a much lower value than normal. Moreover, I was most concerned to find a very high SWR. Putting two and two together, it seemed reasonable to assume that the array had "developed a leak." Not true, dear Henry!

After carefully inspecting the antennae, all seemed in order, but I still had the nagging feeling that it must be up there somewhere. Out came the Noise Bridge (it is a bit special for these frequencies) and, low and behold, the SWR was "spot-on."

To cut a long story short, the problem was with the Bird 43 Thruline Watt- meter. For those with one of these units the trouble was the meter connection to the sampling point. It must have been dirty (although it appeared spotless), for all was cured by cleaning the connection. Instantly, the SWR returned to normal.

Incidentally, a common problem with this meter can occur with the connections between the plug-in sensor and the main housing. The most common fault occurs when the connections to the body of the insert can also cause trouble. The symptom is, intermittent or no readings. Here the cure is to re-tension the connection finger, clean the insert connections and body of both the unit and sensor. The above fault was unusual as it was none of these problems.

My low Sun Noise is yet to be corrected, but it is now a fair bet that the LNA upstairs has gone downhill as they are prone to do with time.

RF GETTING INTO THE KEYBOARD OF AN IBM CLONE

Whilst operating AMTOR or RTTY on 80 or 40 metres, I was getting RF into what seemingly was the keyboard curly-cord interconnecting with the computer. It was so bad that on 80 metres, only 25

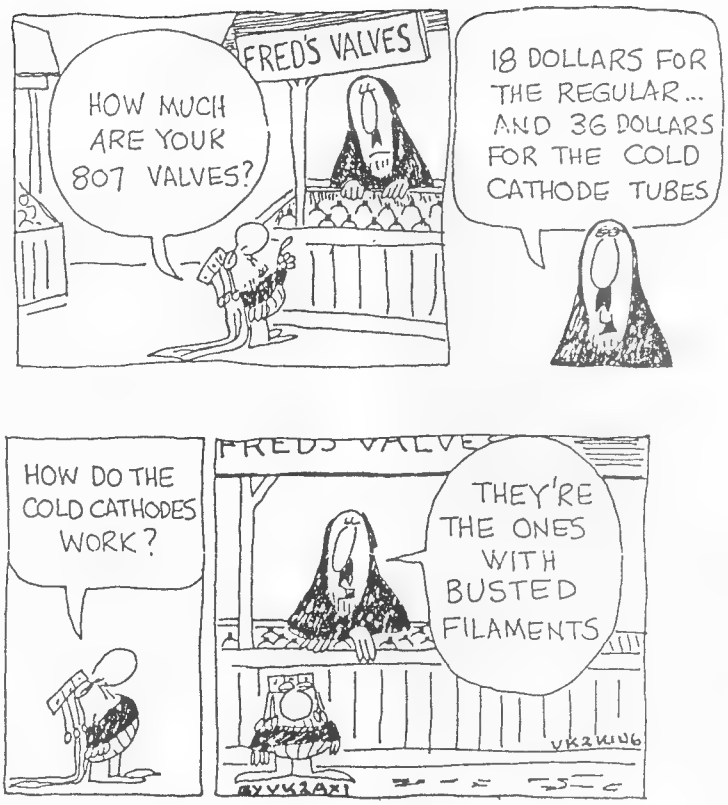
watts of RF output would cause total loss of control. Having tried all the normal filtering and grounding techniques on the computer without success, I was faced with what appeared to be a case of removing the mother-board and adding ferrite beads and bypass capacitors. This did not thrill me very much, as those owners of clones will testify!

Upon opening the keyboard, it appeared that the curly-cord was not shielded so I went out and bought a length of double shielded cable and a DIN plug. I wired the plug and then reopened the keyboard.

The next task was to remove the wires from an eight-pin, in-line miniature socket. This entailed using a very fine probe to extract the pins. (A terrible task!).

Whilst doing this, pin two seemed to have a somewhat thicker wire than the others — it was shielded cable! Naturally, it was not connected! ! ! Well, the answer was simple. Scrape the solder resist adjacent to this pin (they already provide the pad) and attach about 150 mm of hookup wire to this point. You will notice that the keyboard has a metal plate onto which the keypad PCB is mounted and also the back cover is another metal plate. Simply solder a spade terminal lug to the end of the wire and another halfway along this wire. (It is advisable to strip the insulation). Clean both covers around the mounting holes (I actually tinned each), and place the lugs over the holes. Lower the back cover down over the lug and replace the screws. What you have done is simply grounded the top and bottom metal plates to the shield. Not a sign of RF is getting into the keyboard now and radiation from the keyboard has all but vanished.

This was not an isolated instance as I have knowledge of several other clones which were configured and responded in the same fashion.



Cartoon courtesy *The Propagator*

Education Notes

Brenda Edmonds VK3KT
FEDERAL EDUCATION OFFICER
56 Baden Powell Drive, Frankston, Vic. 3199

Over the last few weeks, I have sat through a large number of lectures or talks on a range of topics directly or indirectly related to professional or private interests. All were attending voluntarily.

Some of them were interesting, many informative, and some literally put me to sleep. In the more boring parts I started to make notes on 'dos' and 'don'ts' for lecturers — which I hope I shall remember to check if I am ever required to give a lecture.

A few of these points may be worth mentioning for others who may be asked to fill in an evening.

FIRSTLY CONTENT:

The material should be able to be understood by the audience. This is of course obvious, but may be difficult with an audience of mixed or unknown backgrounds. Many lecturers, usually experts in their own field, cannot come to terms with the lack of specialised knowledge of an average audience. An astute lecturer can assess the audience reaction and adjust the level accordingly. Too low a level, of course, results in boredom instead of confusion.

LENGTH:

There is a limit to how much should be presented in one session. If a long session is necessary, give a few minutes break in the middle, or schedule it is two parts around a coffee break, thus avoiding 'information overload', stiff joints, and audience discomfort.

QUESTIONS:

It is the lecturers prerogative to decide whether questions will be accepted during the talk, afterwards, or not at all. If accepted, they should be treated seriously, and answered clearly and concisely. It may be necessary to backtrack until a problem is resolved, or offer to discuss the question in more detail personally later.

Incidentally, a lack of questions at the end does not necessarily mean that all is crystal clear to the listeners. They may be totally confused, wary of showing their ignorance, bored, or just more interested in the forthcoming coffee.

VOICE AND MANNER:

There is need for variations in voice pitch and speed. Body movement helps too — anything that brings back the listener's wandering attention. Visual aids such as films, slides and overhead projector transparencies are also useful interruptions to a long talk.

VISUAL AIDS:

These are usually only aids, used to elaborate or clarify the lecture material, not as a way of presenting maximum information in minimum time. They should be relevant, clear, adequately labelled, and legible from all parts of the room or theatre (the whole system should be arranged and checked before the lecture begins).

On the one day I saw OHP transparencies which had been photocopied from poorly printed textbook tables and were almost completely illegible and transparencies that were so well produced that half the audience (mostly teachers) converged on the speaker afterwards to ask how they had been produced. I, for one, remember more of the transparencies than the lecture.

HANDOUTS:

If a lot of diagrams or figures are to be shown, many listeners appreciate copies being made available afterwards. Handouts can also substitute for slides or transparencies.

IN SUMMARY:

The success and value of a lecture is not always in the words alone. The content could be presented on a sheet of paper and we could all go home an hour earlier. Sometimes I feel this would be preferable but a lecturer who is prepared to give thought to the manner of presentation as well as the content is more likely to receive a second invitation.

Best wishes to all those sitting for the November examinations. Remember to **read the question** and **all the answers too!**

—73 Brenda VK3KT

Intruder Watch

Bill Martin VK2COP
FEDERAL INTRUDER WATCH CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW. 2077

I hate to have to open the column with news of more intruders, but information received from IARU Region 1 reports the following:

"Despite Resolution 641 of WARC 1979, three more broadcast stations have appeared in the 7.0-7.1 MHz band. (i) Radio Iran, 7.075 MHz (and 9.400), 1830 to 1930 UTC; (ii) Radio Damascus, 7.085 MHz 1800 and on (iii) Trans-World Radio (Monte Carlo) 7.100 MHz, 1800 UTC."

Fortunately, these are Region 1 observations, and may or may not cause interference to amateur stations here in Region 3. We hope they don't!

JUSTICE METED OUT?

Gib W7JIE, the Region 2 Monitoring System Co-ordinator also has news for us this month. Gib reports that he has information to hand that the USSR operates over 2 000 jamming stations, with a personnel allotment of 15 000 people to run the machines! ! ! No wonder we run across so many jammers in our travels around the bands.

On a lighter note, the USSR recently accused Great Britain of jamming some of the Russian transmitters . . . this was denied. Then an investigation by Great Britain clearly showed that the Russian jammers were jamming their own programming transmissions! Poetic justice . . .?

RECEIVED WITH THANKS

July last saw reports received with thanks from VK2s AAB, BQS, PS, QL, G Bradford, VK3XB, VK4s AKX, BG, BHJ, BTW, DA, KHZ, OD, VK5GZ, VK6s JQ, OD, RO, XV, VK7RH, VK8s HA and JF.

There were 397 broadcast (A3E) mode intruders reported; 175 CW (A1A); 91 RTTY (F1B); 92 other modes (R7B, J3E, N0N, B9W, P0N-woodpecker), and 57 intruder stations obliged by transmitting their call signs. Plenty of jammers were evident on 40 metres. One USSR station, UK3A, was heard working Russian amateurs . . . one wonders what was going on there?

TRYING TO RECTIFY THE SITUATION

Jim VK8JF, has been reporting for some time now, the activity by stations on 14.051 MHz at about 0210 UTC using CW and passing commercial traffic. Quite regular offenders, and the IW would be pleased to hear from any other amateurs or SWLs who may be hearing these signals. We are at present trying to do something about it. The signals are apparently coming from north-west of Darwin, and may not be apparent in Australian southern States.

If you find yourself hearing strange modes of emission on the bands, and are curious to know what they are, then perhaps I can help. I have a master tape prepared of most of the different modes one is likely to encounter on the bands, and if your send me a blank C60 cassette, I will copy the master on it for you. Although this tape is primarily for use as an Intruder Watcher's aid, it is of interest to anyone who listens around the bands. Send to the address at the head of this column.

HAVE YOU HEARD IT?

If any VK6 operators are hearing a harmonic of station 6WF on 3.600 MHz, I would be pleased if you would drop a line to Bruce Hunt VK6XZ, 59 Pembury Road, Thornlie, WA. 6108. Bruce is the VK6 Intruder Watch Co- ordinator. We like to have reports on local broadcast station interference from **several** sources to exclude the possibility of spurii/cross- modulation effects on the listeners receiver.

So we seem to have come to the end of another column, and I will finish by saying "take care" and wish you all 73 until next month.

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TYPE	DIAM	LENGTH	TPI	IND uH	SWG	PRICE
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1-16	½"	3"	16	5.50	21	$2.12
2-08	⅝"	3"	8	2.70	19	$2.50
2-16	⅝"	3"	16	8.00	21	$2.50
3-08	¾"	3"	8	2.90	19	$3.05
3-16	¾"	3"	16	10.90	21	$3.05
4-08	1"	3"	8	4.80	19	$3.38
4-16	1"	3"	16	19.90	21	$3.38
5-08	1¼"	4"	8	9.40	18	$3.74
5-16	1¼"	4"	16	37.50	21	$3.74
8-04/4	2"	4"	8	—	18	$5.45
8-10/4	2"	4"	10	32.25	18	$5.45
8-12/4	2"	4"	12	—	19	$5.95
8-16/4	2"	4"	16	83.50	19	$5.95
8-08/7	2"	7"	8	—	18	$9.45
8-10/7	2"	7"	10	60.80	18	$9.45
8-12/7	2"	7"	12	—	19	$9.95
8-16/7	2"	7"	16	157.75	19	$9.95

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AMSAT Australia

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NATIONAL CO-ORDINATOR
Graham Ratcliff VK5AGR
INFORMATION NETS
AMSAT AUSTRALIA
Control: VK5AGR
Amateur Check-In: 0945 UTC Sunday
Bulletin Commences: 1000 UTC
Winter: 3.685 MHz — Summer: 7.064 MHz
AMSAT PACIFIC
Control: JA1ANG
1100 UTC Sunday
14.305 MHz
AMSAT SW PACIFIC
2200 UTC Saturday
21.280/28.878 MHz

Participating stations and listeners are able to obtain basic orbital data, including Keplerian elements from the AMSAT Australia Net. This information is also included in some WIA Divisional Broadcasts.

ACKNOWLEDGMENTS
Contributions this month are courtesy Bob VK3ZBB, Graham VK5AGR, UoSAT Bulletins, and AMSAT-UK's *OSCAR News.*

NEW UOSAT SCHEDULES

—from UoSAT-OSCAR 11 Bulletin Number 54 on September 13, 1986

As promised in previous bulletins, we have reviewed spacecraft operations schedules for both UoSAT-1 and UoSAT-2. From this review, we have decided on new schedules for the satellites. Descriptions of the schedules and the considerations which shape them follow:

Until 1985, switching the downlink data content on either satellite meant loading a new program to the On-Board Computer (OBC) or otherwise commanding the satellite from the ground. Implementation of the schedule depended on UoSAT staff and equipment being available each day to load software to the OBC. UoSAT staff spent a lot of time up-loading software to the satellite.

When Steve Holder joined the UoSAT team, one of his first tasks was to design and implement a *Diary* program to automate the selection and rotation of downlink data contents. This program is now in place on both UoSAT satellites. The Diary can be programmed days, weeks or months in advance, so the schedule does not depend on UoS commanding the satellite every day.

The interests of several groups of "UoSAT Users" were kept in mind during the formulation of the schedule. Stations using the UoSATs as educational aids (or simply to bring satellites to a wider audience), are interested in the *Digitalkers;* those that want detailed data find the Digitalker a waste of time. Many people are interested in the CCD camera experiments. Advanced experimenters would like to get a chance to listen to the UO-2 high-speed downlink or the 2 GHz beacon. These sub-groups within the user community are "contending" for a fixed amount of downlink time.

The engineers within UoS also have needs. Most of them want lots of data from a specific experiment at a specific — but often unscheduled — time. Those involved in the Digital Communications Experiment need access to the UO-11 uplink and downlink on a regular basis and are interested in allowing selected ground-stations worldwide to participate in the DCE network. The schedule has to balance these diverse desires with the capabilities of UO-9 and UO-11.

UOSAT OSCAR-9

UO-9 will be scheduled on a monthly basis.

After asking for comments from the UoSAT user community, we decided to not have a weekly bulletin on UO-9, but to only reload the UO-9 Diary program monthly. As a result, the UO-9 schedule will be more reliable.

The "bulletin" portion of the UO-9 Diary rotation will carry the month's schedule.

The HF beacons on UO-9 will be on every day, depending on the power budget.

CCD pictures will be transmitted on UTC Wednesdays. The pictures will be from the previous Thursday. The Newsflash will carry time and date of the image.

A new WOD survey will begin each day. Some surveys will begin at UTC midnight, while others will be scheduled for equator crossings or other interesting times.

On three consecutive days per week, WOD surveys will include the Radiation Experiment (channel 3) and channel 13 which monitors its high-voltage power supply.

UO-1 will be turned off by the OBC on Thursday afternoon UTC. The UoS ground-station will use the "window" to take CCD pictures, modify the schedule, load "Newsflash" bulletins and (monthly) reload the Diary.

UOSAT-1 SCHEDULE

Saturday	WOD (w/ Radiation Experiment)/ TLM/SKED/STAT
Sunday	WOD
Monday	WOD
Wednesday	WOD/TLM/SKED/STAT
Thursday	Satellite turned off around 1500 UTC
Friday	WOD/TLM/SKED/STAT

HF Beacons — daily
(SKED = Monthly schedule; STAT = OBC status messages)

UOSAT OSCAR-11

The Diary schedule for UO-11 is designed to take advantage of easy up-loading and large memory.

Bulletins including Keplerian elements will be loaded weekly. More frequent updates will be made as necessary.

The Digitalker will be placed in the UO-11 rotation on UTC Wednesdays, primarily for school demonstrations. This will probably not happen until October, because the software must be written and tested. It will be worth the wait, though since the higher deviation on the UO-11 FM downlinks will mean a much clearer Digitalker signal, and the UO-11 Digitalker has a larger vocabulary than that on UO-9.

Wednesday will see both the 70 cm and the two metre beacons on. The 70 cm beacon will carry a mixture of 1200 bit/sec Diary data and 4800 bit/sec DSR data. The DSR data is intended mainly for those testing demodulator designs. We hope that scheduled 4800 bit/sec transmissions will stimulate interest, perhaps resulting in a demodulator design being published and further DSR/CCD time being scheduled.

The 2 GHz beacon will transmit on UTC Saturdays beginning in October. We encourage experimenters to send up reports of the SHF beacon reception.

WOD channels will be selected with an eye toward interesting combinations of telemetry points. UoSAT users should write in with their "WOD Requests."

UOSAT-2 SCHEDULE

Sunday	Diary (WOD/TLM/STAT/BULL)
Monday	Diary
Tuesday	Diary
Wednesday	Diary and Digitalker (when ready) and 70 cm day
Thursday	Load Bulletins during the morning (UTC). Diary
Friday	Diary
Saturday	Diary and 2 GHz beacon

IMPLEMENTATION

The schedule described above is being gradually implemented, and will be completely in place by the end of October. It will then run until January 1987, when we will review it. If you have an opinion about the schedule, let us know by dropping us a line!

LIMITATIONS

The above schedule would, ideally never be interrupted. There are facets to the UoSAT missions, however, which make rigidly-scheduled operation undesirable. Experimenters at UoS are working on the engineering projects that will eventually become UoSAT-C. These experimenters sometimes require operations that cannot be scheduled in advance. Unscheduled operations are most likely to effect UO-2 listeners who hear the satellite at the same time as the UoS Command Station. Generally, if you do not hear the signal you expect on two metres, check the 435.025 MHz downlink. Unscheduled interruptions of the regular two metre schedule in these circumstances will never be eliminated, and we suggest that you make the best of them by listening in on unusual activities on two metres or 70 cm.

Within the above limitations, the new UO-1 and UO-2 schedules will provide a way for experimenters and educators to plan their use of the satellites. The schedules also streamline daily operating procedures at the UoS ground- station, leaving UoS staff more time to pursue experiments with the existing UoSATs and possible routes leading to further low-cost educational and scientific satellites.

Please remember that while we are committed to serving the users of satellites in education and the amateur satellite service, UO-9 and UO-11 are experimental spacecraft and will always be subject to the needs of the experimental payloads which they carry and the engineering experiments on which the UoSAT Spacecraft Engineering Research Unit depend.

UOSAT DECODER PRINTED CIRCUIT BOARD

Jim Miller G3RUH

This decoder was originally published in *Wireless World (UK)* May 1983 issue. The board features the 1200 Baud circuits; ie limiter, phase locked loop, integrate and dump, lock detector and revised output interfaces. Input filter, 300 Baud and CCD line sync detectors have been omitted. However, the design follows the original almost identically, so the 'hookS7 are there if required (though component numbering is different).

Input	Typically 50 mV — 5V RMS audio from an FM receiver.
Outputs	The 1200 Baud serial data stream is output in three formats: 1. RS232C level 2. Regenerated two-tone audio, in UoSAT-2 CUTS tones 3. CMOS level plus 1200 Hz clock and lock
Controls	Input audio invert switch, UoSAT1/ UoSAT2 switch, lock meter
Set-up	Two preset pots — for PLL frequency and six volt supply
Power	Requires 12 volts at about 15 mA

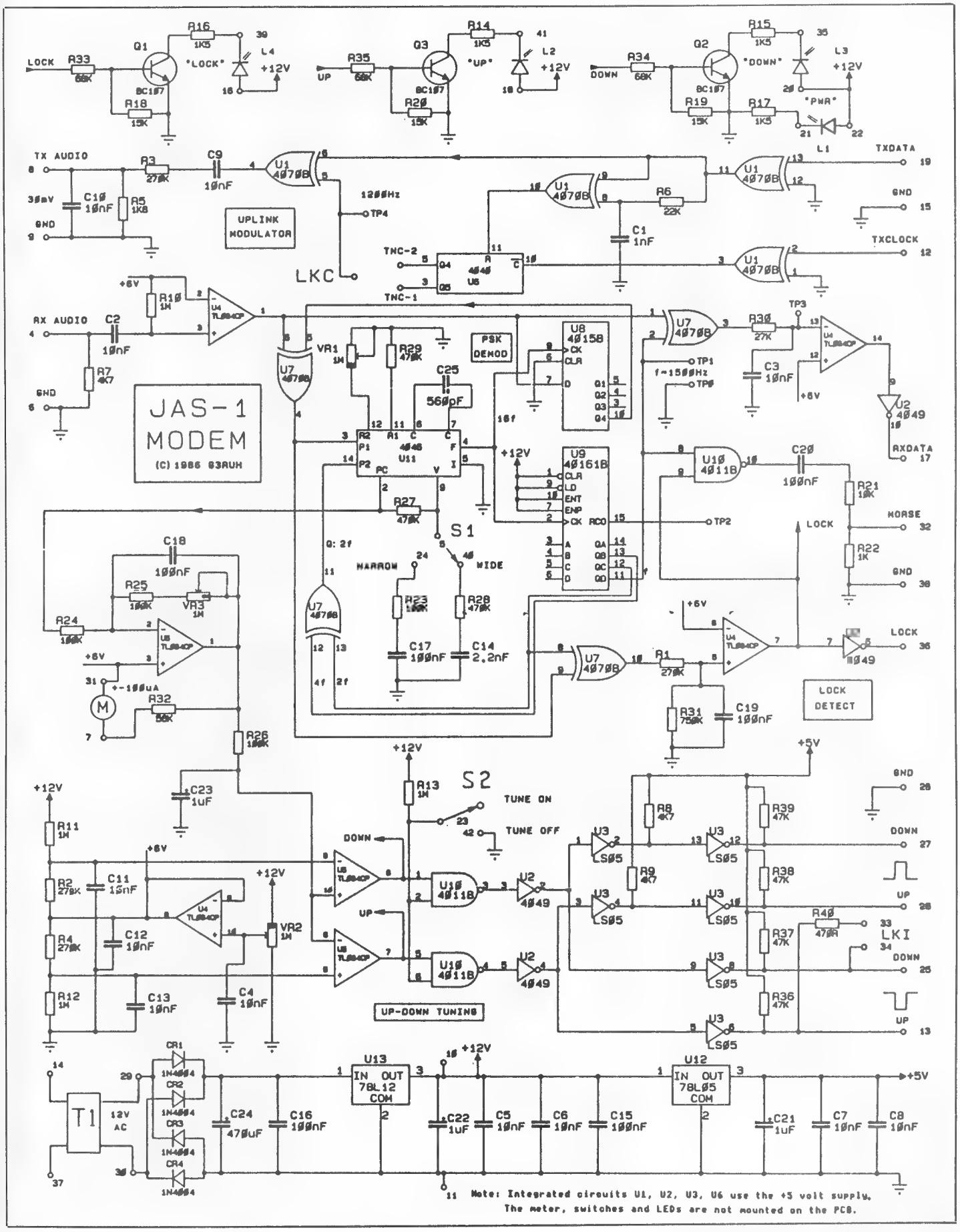
The above printed circuit board and complete article is available from AMSAT-Australia, c/- Box 1234, GPO, Adelaide, SA. 5001 for $35 (including air mail postage). Other than the decoder all that is required to display the data is a computer capable of receiving 1200 Baud ASCII 1 start bit, 7 data bits, even parity and 2 stop bits.

FUJI OSCAR-12 (JAS-1) MODEM PRINTED CIRCUIT BOARD

Jim Miller G3RUH
Extracted from AMSAT-UK's *OSCAR News* Number 61 September 1986

To use the JAS-1 (OSCAR-12) satellite's digital mailbox you need an AX.25 Terminal Node Controller (TNC) system with an external modem replacing the standard TNC's Bell 202 internal modem. (See *OSCAR News* Number 60 July 1986, page 30). Automatic doppler shift tracking is virtually essential.

The complete circuit of a suitable modem is shown. Full instructions (eight pages) are available


JAS-1
MODEM
(C) 1986 G3RUH
UPLINK MODULATOR
PSK DEMOD
LOCK DETECT
UP-DOWN TUNING
LKC
LKI
TX AUDIO
RX AUDIO
TXDATA
TXCLOCK
RXDATA
MORSE
LOCK
DOWN
UP
TUNE ON
TUNE OFF
NARROW
WIDE
S1
S2
T1
12V AC
Note: Integrated circuits U1, U2, U3, U6 use the +5 volt supply.
The meter, switches and LEDs are not mounted on the PCB.

OSCAR-10 APOGEES — NOVEMBER 1986

				SATELLITE		BEAM HEADINGS					
			APOGEE	CO-ORDINATES		SYDNEY		ADELAIDE		PERTH	
DATE	DAY NO	ORBIT NO	UTC HHMM:SS	LAT DEG	LON DEG	AZ DEG	EL DEG	AZ DEG	EL DEG	AZ DEG	EL DEG
1	305	2546	1331:09	-11	212	352	62	22	60	61	47
2	306	2548	1250:11	-10	203	15	62	40	55	70	39
3	307	1550	1209:14	-10	193	35	58	53	49	77	31
4	308	2552	1128:16	-10	184	50	52	64	41	83	22
5	309	2554	1047:19	-10	1174	61	44	72	33	88	14
6	310	2556	1006:21	-10	165	70	36	78	25	93	6
7	311	2558	0925:24	-10	156	77	28	84	17	98	-2
		2559	2104:55	-10	331					263	-1
8	312	2560	0844:27	-10	146	83	20	90	9		
		2561	2023:58	-10	322					268	7
9	313	2562	0803:29	-10	137	88	12	95	1		
		2563	1943:00	-10	312					273	15
10	314	2564	0722:32	-10	128	93	4				
		2565	1902:03	-10	303			267	4	279	23
11	315	2567	1821:06	-9	294	265	1	272	11	285	32
12	316	2569	1740:08	-9	284	270	9	278	19	292	40
13	317	2571	1659:11	-9	275	276	17	284	27	302	48
14	318	2573	1618:13	-9	266	282	25	292	35	314	55
15	319	2575	1537:16	-9	256	289	33	301	43	332	60
16	320	2577	1456:16	-9	247	297	40	312	50	353	63
17	321	2579	1415:18	-9	237	307	48	327	55	17	62
18	322	2581	1334:21	-9	228	321	54	345	59	36	58
19	323	2583	1253:24	-9	219	338	59	6	59	51	51
20	324	2585	1212:26	-8	209	359	60	26	57	62	44
21	325	2587	1131:29	-8	200	20	59	42	52	70	36
22	326	2589	1050:31	-8	191	37	54	54	45	77	27
23	327	2591	1009:34	-8	181	51	48	64	38	82	19
24	328	2593	0928:37	-8	172	61	41	72	30	88	11
25	329	2595	0847:39	-8	162	70	33	78	22	92	2
26	330	2597	0806·42	-8	153	76	25	84	14		
		2598	1946:13	-8	328					266	0
27	331	2599	0725:44	-8	144	82	17	89	6		
		2600	1905:16	-8	319					271	8
28	332	2601	0644:47	-8	134	88	8	95	-2		
		2602	1824:18	-8	310					277	16
29	333	2603	0603:49	-7	125	93	1				
		2604	1743:21	-7	300			270	5	283	24
30	334	2606	1702:23	-7	291	268	2	276	12	289	33

OSCAR-10 APOGEES — DECEMBER 1986

				SATELLITE		BEAM HEADINGS					
			APOGEE	CO-ORDINATES		SYDNEY		ADELAIDE		PERTH	
DATE	DAY NO	ORBIT NO	UTC HHMM:SS	LAT DEG	LON DEG	AZ DEG	EL DEG	AZ DEG	EL DEG	AZ DEG	EL DEG
1	335	2608	1621:26	-7	282	274	10	282	20	297	41
2	336	2610	1540·28	-7	272	279	18	288	28	308	48
3	337	2612	1459:31	-7	263	286	26	296	36	321	54
4	338	2614	1418:34	-7	254	293	33	306	43	339	59
5	339	2616	1337:36	-7	244	302	41	318	49	360	60
6	340	2618	1256:39	-7	235	313	48	333	54	21	59
7	341	2620	1215:41	-7	225	327	53	352	57	38	54
8	342	2622	1134:44	-6	216	345	57	11	56	52	47
9	343	2624	1053:44	-6	207	4	58	29	53	62	40
10	344	2626	1012:46	-6	197	24	55	43	48	70	32
11	345	2628	0931:49	-6	188	39	51	55	41	76	24
12	346	2630	0850:52	-6	179	52	44	64	34	82	15
13	347	2632	0809:54	-6	169	62	37	71	26	87	7
14	348	2634	0738:57	-6	160	69	29	78	18	92	-1
15	349	2636	0647:59	-6	151	76	21	84	10		
		2637	1827:31	-6	326					270	1
16	350	2638	0607:02	-6	141	82	13	89	2		
		2639	1746:33	-5	317					275	9
17	351	2640	0526:04	-5	132	87	5				
		2641	1705:36	-5	307			268	-2	280	17
18	352	2642	0445:07	-5	122	92	-3				
		2643	1624:38	-5	298			273	5	286	25
19	353	2645	1543:41	-5	288	271	3	279	13	293	33
20	354	2647	1502:43	-5	279	277	11	285	21	302	41
21	355	2649	1421:46	-5	270	283	18	292	29	313	48
22	356	2651	1340:49	-5	260	289	26	301	36	328	54
23	357	2653	1259:51	-5	251	297	34	311	43	345	57
24	358	2655	1218:54	-5	242	307	41	324	49	6	58
25	359	2657	1137:56	-4	232	318	47	339	53	25	55
26	360	2659	1056:59	-4	223	333	52	357	55	40	50
27	361	2661	1016:02	-4	214	351	55	15	53	52	44
28	362	2663	0935:04	-4	204	9	55	31	50	62	36
29	363	2665	0854:07	-4	195	27	52	45	44	69	28
30	364	2667	0813:09	-4	185	41	47	55	38	76	20
31	365	2669	0732:12	-4	176	53	41	64	30	81	12

for an SASE from AMSAT-Australia, c/- PO Box 1234, GPO, Adelaide, SA. 5001. Printed circuit boards and a kit of parts are also available from the same address. At the time of writing, the estimated cost of the PCB was $50 and about $25 for the additional kit of parts.

Brief Description

MODEM: Downlink — Receive audio PSK demodulator to TTL digital, 1200 BPS. Uplink — 1200 BPS Manchester encoding modulator to microphone level, transmit audio. Receive carrier LOCK LED indication. Selectable loop bandwidth. Morse code (CW) regenerated tone output.

CONNECTS: to AX.25 TNC "modem disconnect" jack. Suitable for TNC-1 or TNC-2. Only four connections — TXData, RXData, TXClock, Gnd.

DIGITAL AFC: tracks changing doppler shift via the Up/Down signal lines for your receiving rig. Designed for all known Icom, Trio and Yaesu standards. Adjustable for 10-100 Hz/step. Positive pulses, negative pulses and Icom bi-level. Tracking ON/OFF switch. Manual tuning indication by LEDs and/or centre-zero meter.

POWER: AC mains PSU built-in or 12 volts AC input or 12 to 14 volts DC, 20 mA.

PCB: High quality 160 x 100 mm double side, plated through, legended, with full alignment and installation instructions. Standard CMOS and LSTTL used. No hard-to-get parts.

JAS-1 MODEM PARTS LIST

Resistors 5%

R1-R4	270k
R5	1k8
R6	22k
R7-R9	4k7
R10-R13	1M
R14-R17	1k5
R18-R20	15k
R21	10k
R22	1k
R23-R26	100k
R27-R29	470k
R30	27k
R31	750k
R32	56k
R33-R35	68k
R36-R39	47k
R40	470k
R41-R42	47k

Capacitors

C1	1n 10%
C2-C13	10n 10%
C14	2n2 10%
C15-C20	100n 10%
C21-C23	1u 16V tant
C24 **	470u 25V
C25	560 p 5%

Integrated Circuits

U1,7	4070 Quad Exor
U2	4049 Hex Inverter Buffer
U3	74LS05 Hex Inverter OC
U4-U5	TL084 Quad op-amp
U6	4040 12 stage divider
U8	4015 four bit shift register
U9	40161 Divide by 16 (MC14161)
U10	4011 Quad 2 Input Nand
U11	4046 Phase Locked Loop
U12	78L05 five volt regulator
U13	78L12 12 volt regulator **

Semiconductors

Q1-3	BC107 etc (ordinary NPN)
L1-4	LED 10 mA *
CR1-4	1N4004 etc **
D1-2	1N4148 etc
VR1-3	1 M trimmer ⅜" square, flat mounting: eg RS 187-321, Dubilier D79-30, A-B E2B Bourns 3386F, Spectrol 63-M

Sundries

M1 ±100 uA meter * eg RS 259-549, Farnell 143-510

S1-2 SPDT toggle switch *

T1 12 volts 3 VA transformer ** eg RS 297-829, Farnell 141-471

TP0, 1 ,2, 3, 4 test points

Terminals 1-42 for external connections as required. Can also use 0.1" pitch SIL connectors. Max set (1 x 2-way, 5 x 3W, 1 x 4W, 2 x 5W, 1 x 10W)

LKC, LKI made from hook-up wire

Modular PSU 12 volts 100 mA ** RS 591-281, Farnell 147-545

NOTES:

* The meter, LEDs and switches are not mounted on the board.

**Power supply components T1, CR1-4, C16, C24, U13 (or modular PSU) are omitted if external stabilised 12 volts used.

CAPACITORS:
560 pF 0.4" (10 mm) pitch ±5% polystyrene
1n-100n 0.2" (5 mm) pitch ±10% dipped ceramic or polyester 63-100 volts typical
470 uF 25 volts electrolytic 1.0" x 0.4" (25 x 10 mm) approx

RESISTORS:
Carbon film 0.25 or 0.5 watt, 0.4" (10 mm) pitch
Integrated circuits U1, U2, U3, U6 use the +5 volt supply
The meter, switches and LEDs are not mounted on the PCB

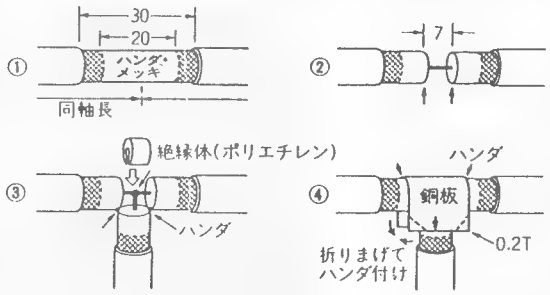
TRAP FILTER FOR JAS-1 (J-mode)

by JA5COY and translated from CQ #7, p.348
by Keith Wilkinson ZL2BJR

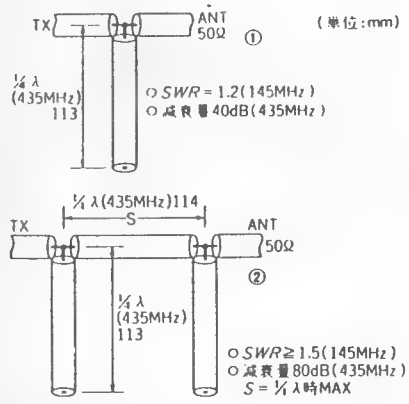
For JAS-1 J-mode, you transmit in the 145 MHz band and receive in the 430 MHz band. The 430 MHz receive frequency is not exactly the third harmonic of the 145 MHz transmit frequency, but there can be problems such as intermodulation or receiver desensitisation. These problems can be eliminated by adding a low pass filter (LPF) or band pass filter (BPF) to the transmitter to reduce the level of the third harmonic by 100 dB (from 10 watts to -60 dBm). If the harmonics are 60 dB below the fundamental (as the regulations say they should be) then the LPF or BPF needs to supply at least 40 dB of attenuation. To eliminate receiver intermodulation due to strong local signals, it is also a good idea to use a filter at the receiver input.

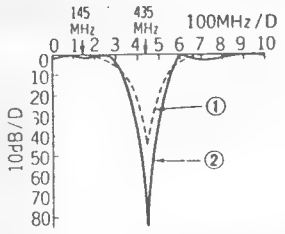
This article describes suitable transmit and receive filters.

第11図　UHF帯で望ましい同軸ケーブルの接続方法(5D(5C)-2Vの場合)
(コネクターは使用しないこと.損失が大きい)

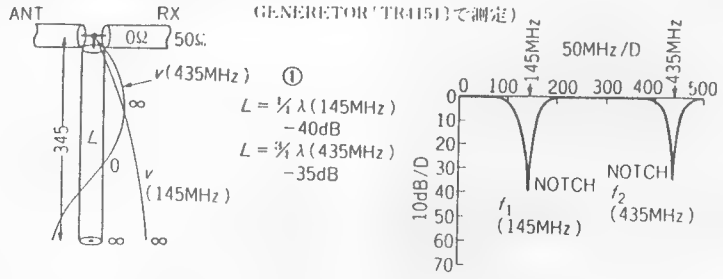


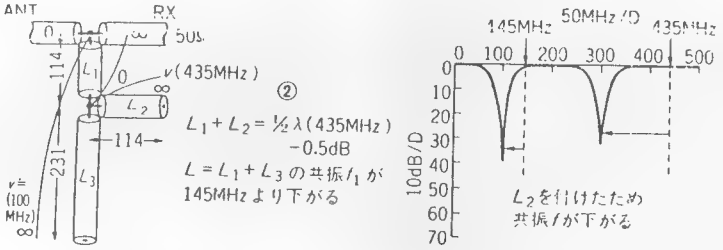
第12図　435MHz同軸オープン・スタブ

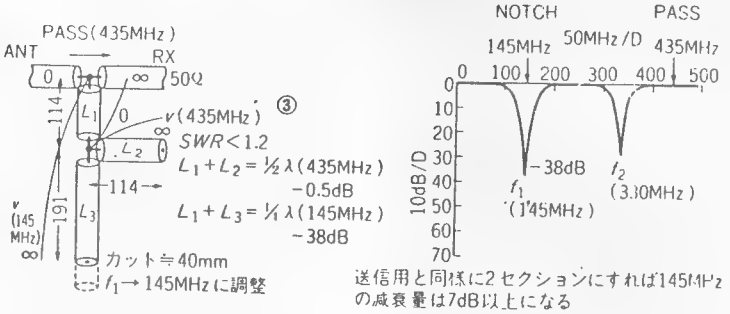




第15図　435MHz同軸オープン・スタブの改善
(タケダTRACKING SCOPE(TR4110) & GENERETOR(TR4151)で測定)

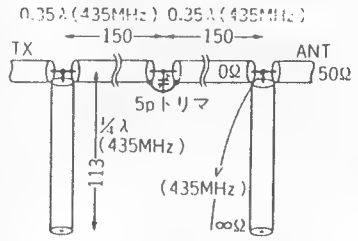






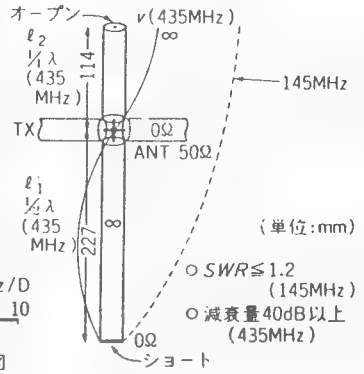
送信用と同様に2セクションにすれば145MHzの減衰量は7dB以上になる

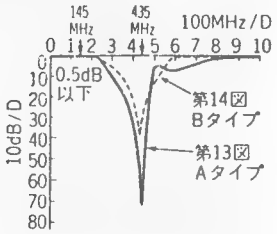
第13図　Aタイプの接続



○SWR≦1.1(145MHz)
(単位:mm) ○減衰量70dB以上(435MHz)

第14図　Bタイプの接続





Transmit filter (435 MHz notch)
A single quarter-wave open stub for 435 MHz connected in parallel with the feeder (Figure 12 (1)) gives 40 dB attenuation at 435 MHz, and 1.2 SWR at 145 MHz. Using two such stubs spaced a quarter-wave apart gives 80 dB attenuation and 1.5 SWR. Spacing two such stubs at 0.6-wave gives attenuation of 70 dB and 1.1 SWR. The circuit in Figure 13 (with 0.7-wave spacing) gives attenuation of 70 dB, and SWR can be adjusted to 1 with the 5 pF trimmer. If about 40 dB attenuation is sufficient, use Figure 14.

This combines a quarter-wave open stub and half-wave shorted stub (at 435 MHz). The combination (quarter-wave plus half-wave) acts like a quarter-wave shorted stub; ie parallel resonant circuit, at 145 MHz, so SWR is virtually unaffected (under 1.1).

Receive filter (145 MHz notch)
A quarter-wave open stub for 145 MHz looks like a three-quarter-wave open stub on 435 MHz — loss on both bands is 40 dB (see Figure 15 (1)). For Figure 15 (2), L1 plus L2 equals half-wave open stub at 435 MHz, (loss is only .25 dB), but the loading due to L2 causes the resonant frequency of L1 plus L3 to fall to 100 MHz. Trim L3 for resonance at 145 MHz (see Figure 15 (3)). SWR is 1.1. These filters can be built inside your rig if space permits — this will not affect filter characteristics.

Constructional cautions
Dimensions in the figures are in millimetres.

Use 75-ohm coaxial cable for the stubs — for high Q and high attenuation.

Connect the stubs as per Figure 11:

1 Measure from centre of joint. Tin the centre 20 millimetres of braid.
2 Use cutter; do not cut wire.
3 Solder braid where it touches, cover joint with sheath.
4 Wrap with copper foil and solder.

SATELLITE ACTIVITY FOR THE MONTH OF JULY 1986

1. LAUNCHES
The following launching announcements have been received:

1986-050A (16849)	Cosmos 1761	July 05	USSR
1986-051A (16855)	Cosmos 1762	July 10	USSR
1986-052A (16860)	Cosmos 1763	July 16	USSR
1986-053A (16861)	Cosmos 1764	July 17	USSR
1986-054A (16874)	Cosmos 1765	July 24	USSR
1986-055A (16881)	Cosmos 1766	July 28	USSR
1986-056A (16883)	Cosmos 1767	July 30	USSR
1986-057A (16885)	Molniya 1-67	July 30	USSR

2. RETURNS
During the month 45 objects decayed including the following satellites:

1975-057A	OSO 8	July 09
1986-022A	Soyuz T-15	July 16
1986-0048A	Cosmos 1760	July 03
1986-051A	Cosmos 1762	July 24

ar

Awards

Ken Hall VK5AKH
FEDERAL AWARDS MANAGER
St George's Rectory, Alberton. SA. 5014

AWARDS ISSUED RECENTLY

DXCC PHONE
348 Ray Dobson VK5DI

DXCC OPEN
234 David Jewell VK0DJ
235 Bert Lower VK5AOL

WAVKCA
1500 Donald Simmonds K5BDX

Congratulations are extended to David, on the first WIA DXCC from mainland Antarctica, so far as the records show!

ALGOA BRANCH AWARD

This award is available to any amateur who submits proof of contacting stations in at least four of the eight categories listed below. Endorsements will be issued for any further categories contacted.

Categories
1 Any member of the Algoa Branch of the SA Radio League operating in the Eastern Cape*.
2 ZS1, ZS2, ZS4, ZS5 or ZS6. Republic of South Africa.
3 ZS3 Namibia.
4 H5 Bophuthatswana.
5 S4 Ciskei.
6 S8 Transkei.
7 V9 Venda.
8 7P Lesotho, 3D6 Swaziland or A2 Botswana.

All contacts must be made on or after January 1, 1986 and may be in any mode on 160, 80, 40, 20, 15, or 10 metres.

The award is issued free of charge.

Applications, with QSL cards, should be sent to: The Awards Manager, Algoa Branch Award, PO Box 10050, Linton Grange, 6015 Port Elizabeth, Republic of South Africa.

** Members are: ZS2s — A, AAE, BE, C, DJ, DO, F, G, HH, HV, JC, KG, KU, MD, NC, NH, OC, OE, RN, SM, SP, U, UI, W, WM.*

MELLISH 87 DXPEDITION

An Australian-American Effort
The following is a letter from Ken Keenan K4ADN, 8609 66th Street North, Pinellas Park, FL 33565, USA. Ken is soliciting support for an anticipated DXpedition.

I would like to form or participate in a DXpedition to Mellish Reef in August 1987.

Mellish Reef is approximately 804 km off the north-eastern coast of Australia at 17.25 degrees south, 155.5 degrees east. It is uninhabited except for crabs and the like, and has a maximum elevation of two metres above sea level. It is a DXCC country — VK9M/Mellish Reef.

My preliminary thoughts regarding Mellish 87 — subject to feedback received as a result of this letter — are delineated below:

Semi-round-the-clock, 5-7 days operation, plus or minus propagation and the number of operators.

Operators to be 3-10 in number, to include bands and modes preferred by the operators. I operate 20 metres SSB; other individuals with that inclination are needed.

Operator's equipment, but we may be able to arrange some equipment from manufacturers. Gasoline-powered generator, fuel for same, and linear amplifiers to be arranged in Australia.

Transportation will be in two phases: My personal plans are to bring my wife to Sydney, leave her there with friends, and then fly to Cairns for the boat trip to Mellish Reef.

Each operator would assume his own travel expenses plus an equal share of the common expense. Common expenses include boat transportation to/from Mellish, provisions for the stay there, generator/linear rental, etc. My guess at operator expenses that are common is $2000 per operator, to be revised as we get better data.

An Australian volunteer is badly needed to help with Government Clearances/Call Sign, and exploring the Cairns/Mellish boat options.

Florida West Coast DX Ring have volunteered to look after QSL cards.

After receiving responses, I will prepare a tentative schedule for review. That schedule will include a commitment date for operators, at which time part of the expenses will be required to be forwarded to the treasurer. Please include in your responses your estimate of the time required to accomplish the above tasks and your home and office telephone numbers.

AWARD WINNERS FROM THE US

Mary Duffield WA6KFA, a retired Santa Cruz, CA school teacher, has been named winner of the first "Amateur Radio Ambassador Award" by Advanced Electronics Applications of Lynwood, Washington. The award includes a $1000 prize.

Mary was chosen from a list of 50 nominees for her work encouraging young people to communicate with the world using computers and amateur radio. The award was created with the hope of encouraging radio amateurs to promote the amateur radio service to the public.

The Senator Barry Goldwater Scholarship of $5000 was awarded to William Hulka KA9AKI, of Kokomo, Indiana. William ranked second in his high school class and is an Eagle Scout. He has been a licensed amateur since 1978.

The Perry Hadlock, K2IK Memorial Scholarship of $500 was awarded to Michael Dargel N1AMR, of East Lyme, Connecticut.

The Paul and Helen Grauer Scholarship, $500, was awarded to John Alcorn KA0EMS, of Sedalia Missouri. KA0EMS ranked second in his high school class and is presently attending the University of Missouri at Rolla majoring in Aerospace Engineering. He has been licensed since 1979.

—From *The ARRL Letter*, September 15, 1986

WIA 75 AWARDS

Following are further recipients of the WIA 75 Award.

Certificate No 673 — Bolek SP8JMA
Certificate No 674 — Chairil Hamid YC7DF
Certificate No 675 — H S Yamani YC7DX
Certificate No 676 — Protess One Club YB7ZXX
Certificate No 677 — Abdul Kadir YC7CY
Certificate No 678 — Widjaja Kiharto YC3DSK
Certificate No 679 — Dion Soemardiono YC3JVB

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QSP

RF LIGHTING DEVICES

The ARRL has filed comments regarding FCC proposals to impose radiation limits on radio frequency (RF) lighting devices operating below 30 MHz. This is to ensure that these devices do not interfere with other radio services, including the amateur service.

RF lighting is a new technology in which RF energy is used to produce light. RF bulbs are incidental radiation devices to the extent that a portion of the RF energy escapes into space, with the potential for causing interference.

In 1983, the ARRL Laboratories conducted tests on several of these bulbs which indicated interference signal strengths from S1 to S7 on frequencies from 63 kHz through to 7300 kHz, with the receiver using an indoor antenna a metre from the bulb.

The ARRL believes that the radiation levels of the bulbs tested are considerably less than maximum levels proposed by the Commission in their proposal. The ARRL suggests that the FCC encourage the private sector to produce an adequate set of standards, and that the bulbs carry labels which would educate consumers about the potential interference.

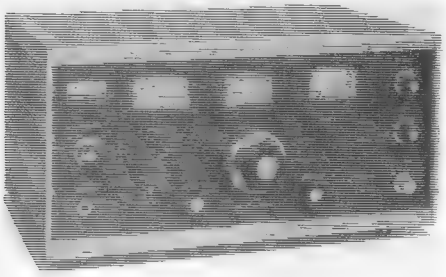
—From *The ARRL Letter*, August 15, 1986

Know your Second-hand Equipment

Ron Fisher VK3OM
3 Fairview Avenue, Glen Waverley, Vic. 3150

If you have been a regular follower of this series, you will have noted that I have not as yet covered Kenwood equipment. This time I shall attempt to appease the Kenwood enthusiasts.

Kenwood did not come into being until the release of the TS-520 transceiver, about August 1974. Before this time the name *Trio* was used.



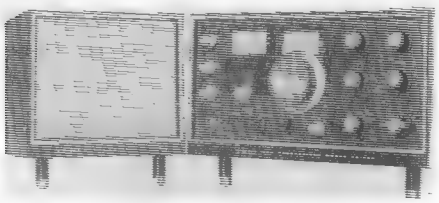
During the mid-1960s, Trio produced several popular general coverage receivers, the best known being the 9R-59 series. These used a basic single conversion set-up with a 455 kHz IF. Two tuning dials gave general coverage tuning, plus calibrated band spread on the amateur bands. Even today, these receivers are prized possessions with the listening fraternity, especially broadcast band DXers.

However, they did have their problems with frequency stability and poor dial-readout ability. Dating from the 1960s, they were a tube-type circuit throughout.

Coverage was from 550 kHz to 30 MHz in four bands. A total of eight tubes, plus diodes for AM detector, noise limiter, AGC and power supply, were used. A product detector was provided for SSB reception. Many modifications were published in *Amateur Radio* magazine during the mid-1970 period.

New price for the 9R-59DE in 1967 was $160. The later, but very similar 9R- 59DS was $175 in 1970. Secondhand value today would be about $75 for both models.

The first amateur band SSB/CW transceiver released by Trio in Australia, was the TS-500. It was first advertised in the May 1968 issue of AR magazine.



It was basically a tube design, but did have two transistors in the VFO and one in the crystal calibrator (the crystal was an optional extra!). The 80 to 10 metre amateur bands (no WARC bands, of course) were covered in 600 kHz steps. A single conversion setup was used with an IF frequency of 3.390 MHz and a rather basic four-pole crystal filter.

The VFO was followed with a crystal mixer to provide the correct injection frequency. A pair of 6146 tubes were used in the final stage with about 100 watts PEP output. The two major problems with the TS-500 were rather poor frequency stability and the very wide selectivity of the four-pole crystal filter.

The TS-500 was normally supplied with a matching AC power supply, although this was an option and many transceiver were powered from home-built supplies. Another option was an external VFO, the VFO-5, but no DC power supply was available for mobile operation.

In general, the TS-500 was rather overshadowed by the FT-200 transceiver, which offered very much better performance for a similar price.

The new prices of the TS-500 transceiver with matching PS-500 power supply was $576 when first released in 1968. Secondhand value today would be about $175. The external VFO would add another $40.

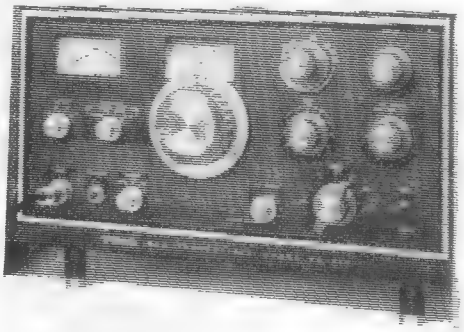
A receiver-only version of the TS-500 known as the JR-500SE was available at the same time as the transceiver. It was an amateur band only receiver and used the same VFO as the transceiver to provide 600 kHz segments on each of five bands with three segments on 10 metres.

A double conversion IF was used with the main selectivity provided by so- called mechanical filters at 455 kHz. Only one choice of selectivity was available for all modes and this was quoted as 3 kHz at -6 dB.

Seven tubes, two transistors and five diodes were used. I have never used a JR-500SE, so I can only speculate at its performance which I imagine would have similar problems as the TS-500 transceiver.

New price was $295 and the secondhand value of this rather rare piece of equipment would be about $100.

In 1971, Trio announced a new transceiver, the TS-510. This transceiver had the same general specifications as the TS-500, but was much improved in the stability and selectivity departments.



By a strange coincidence, it had a remarkable similarity in many respects to the Heathkit SB100 and SB102 transceivers. The IF was the same with a double conversion setup using frequencies of 8.5 and 3.395 MHz.

Whilst it was still basically a tube-type transceiver, a few more transistors were used, compared to the older TS-500. A similar range of accessory items were available which included the AC power supply and a remote VFO. The calibrator crystal was still an optional extra.

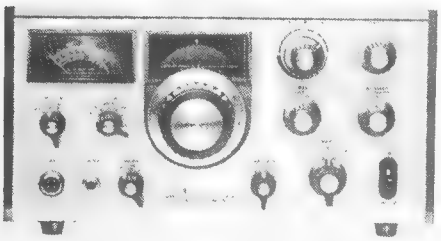
The TS-510 was never widely promoted in Australia, which was rather a pity as it was a very satisfactory transceiver.

New price is not known, but I suspect that with power supply it was in the region of $600. Secondhand value would be about $225, today.

The next transceiver in the Trio-Kenwood range was the TS-511S. I am unaware if any of these were sold in Australia!

They were available in the United States about 1972-73. Very similar in concept to the TS-510, but now with 37 transistors, four FETs and one IC. The day of the solid-state transceiver was on the way.

Power output was up to around 200 watts with a pair of 6LQ6s in the final. PEP power input was rated at 450 watts up to 21 MHz and 360 watts on 10 metres. This put them into the same class as the Yaesu FTDX-400/401 series.



SSB TRANSCEIVER TS-511S

If you ever find a secondhand unit available, I would suggest a value of about $300 with the matching AC power supply.

The last of the early Trio-Kenwoods to be covered this month is the TS-900.

Although not common, a few examples are known to exist in this country. The 900 was really the forerunner of the TS-820 and at the time, was the flag- ship of the Trio Kenwood transceiver line up.

Only three tubes were used in the transmitter final and driver stages and these were two 6LQ6s and one 12BY7. The rest was solid-state with no less than 57 transistors, 16 FETs and three ICs. There was no digital frequency display, but the analogue tuning dial was very similar to the TS-820. A high standard of construction was used with plug-in modular boards used throughout. The power supply was still a separate unit — the PS-900 — and a remote VFO was an option.

It is believed that the TS-900 was capable of an excellent standard of performance. Secondhand value today would be in the region of $450 with the matching power supply.

Next time we will discuss later Kenwood HF transceivers from the TS- 520 onwards.

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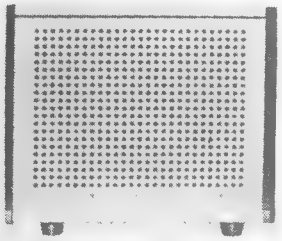
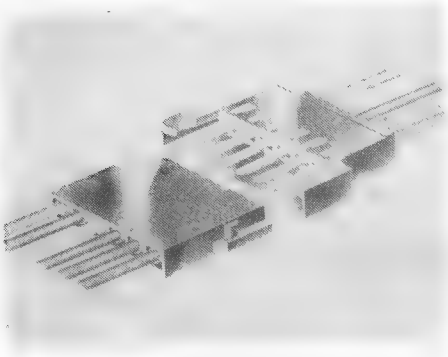


POWER SUPPLY & SPEAKER
PS-511S

A R Showcase



COMPACT CONNECTORS

Utilux have introduced a new, compact 2.0 mm wire-to-wire connector system (in circuit sizes 2 to 10 inclusive) to specifically service the growing areas of miniature and micro-electronics.

Designed by Molex, one of the world's leading suppliers of connectors and modular interconnection products, the system is ideal for a diversity of conditions and situations where tight, compact packaging is essential.

Meeting this criteria, the system is particularly unique in its package width, a remarkably small 2.7 mm, which accordingly coincides with a very light weight.

Such a conservative size/weight combination renders the connector system suitable for a wide range of mini and micro electronic applications. The system can be employed to space-saving advantage in car stereos, word processors, video cameras and security equipment, as well as mobile radios and telecommunications equipment.

The system's contacts are tin-plated and of the high pressure variety, with gold plated options also available.

This wire-to-wire connector system further expands the company's broad capacity to meet state-of-the-art needs in the electronics industry.

Further information may be obtained from Utilux Pty Ltd, 14 Commercial Road, Kingsgrove, NSW. 2208. Telephone: (02) 50 0155.

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COMPACT DISC PLANT TREBLED TO TAP WORLD MARKET

Plans for Australia's first manufacturing facility for compact discs due to be in operation by March 1987, have been significantly upgraded to capitalise on the world-wide shortfall in compact disc production which is forecast to continue well into the 1990s.

Details of the decision, which will see an Australian company become one of the largest producers of CDs in the world before the end of next year, were announced in Sydney by Disctronics Limited.

These plans will see the company more than double its planned investment in Australia's first compact disc plant, which will be located in Melbourne, from $18 million to $38 million and the annual output of compact discs will rise from a planned five million units per annum to 15 million per annum.

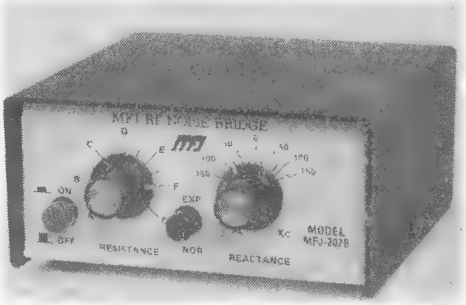
In addition to the music recording industry, compact discs have important new applications in the electronic data storage industry. One disc has the capacity to store the equivalent of 150 000 printed pages or 1200 standard five and a quarter inch floppy discs - equal to a complete 26 volume encyclopedia.

It is believed by many industry observers, that CD-ROM (Read Only Memory) technology can make existing on-line data bases largely obsolete.

NOISE BRIDGE FOR MEASURING WIDE Z-RANGE

The MFJ-202B Antenna Noise Bridge is capable of measuring resistance, reactance and impedance into the region of thousands of ohms.

Most noise bridges allow only measurements in the tens or, at most, hundreds of ohms, which generally becomes inconvenient, particularly when working with wire array-type antennas. The MFJ-202B incorporates a specially designed 'Range Expander' which allows it to read up to 3800 ohms resistance, and capacitive and inductive reactances of up to 1900 ohms.



The noise bridges have a very high accuracy as they are individually factory calibrated before despatch from Starkville, Mississippi.

Using the unit in conjunction with an appropriate receiver over its operating frequency range of 1 to 100 MHz opens up a whole new world of tuned circuit measurements.

Some of the useful tasks covered in the MFJ-202B's manual are: Finding Antenna Resonant Frequency, Cutting a Halfwave Dipole to Frequency, Tuned Circuit Alignment, Measurement of RF Amplifier Impedances, RF Transformers and Baluns, and Capacitance and Inductance Measurement.

For further information or a brochure contact GFS Electronic Imports, 17 McKeon Road, Mitcham, Vic. (03) 873 3777.

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TALK THROUGH YOUR EAR

The Ear-Mike is a unique combination earphone and microphone which enables the wearer to receive, and transmit by using the voice energy detected in the ear canal.

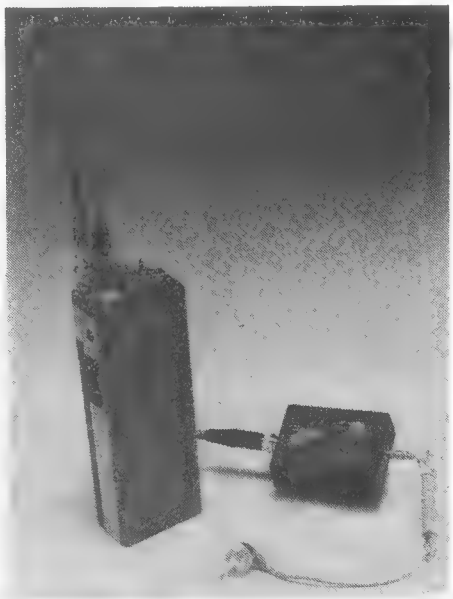
Human speech is generated from the Larynx (voice-box) and an extremely small amount of this energy in the form of air movement is carried to the ear drum causing it to modulate.

The EM-200 Ear-Mike, developed by Sydney-based Hayden-Spike Co Pty Ltd, uses a specially designed audio transducer which detects the voice energy in the ear canal.

The transducer comprises a high impedance coil having a DC resistance of about 1 000 ohms (preferably higher) and has a magnet movable relative to the coil by a diaphragm, fixed either to the magnet or the coil.

Of a similar size to a hearing aid earpiece, the transducer is held in the ear by a hollow casting — just the same as is used to seal a hearing aid earphone to an ear.

The earpiece can also be adapted to fit in, or adjacent to, the ear — and when used with ear protectors, provides the answer to difficult communications in noisy environments.



The EM-200 Ear-Mike and Interface Unit.

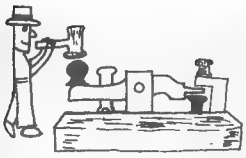
In the case of personnel wearing breathing apparatus, such as firefighters, the Ear-Mike solves their communications problems.

The unit has a small interface which goes between the transducer and a hand-held type radio. This black-box, usually worn on a belt alongside the radio, contains a two stage amplifier powered by a 1.5 volt cell and has a press-to-talk function.

The Ear-Mike was awarded a gold medal at the *Exposition of International Inventions* in Geneva, 1984. It is now used by defence departments, security services, law enforcement agencies, emergency services, aviation authorities and private enterprise.

Hayden-Spike is now developing another export potential product — a digital encryption (scrambler) device for portable radios — which can be programmed with up to six billion different encryption codes.

—Submitted by Jim Linton VK3PC



Pounding Brass

Marshall Emm VK5FN
Box 389, Adelaide, SA. 5001

This month sees the inauguration of what may become an annual (or even more frequent) event — the National Sprints. Contesting in Australia has been going downhill over the last few years, at least from the point of view of one who has found it more difficult each year to run up a few numbers in the RD and the John Moyle. Did I read correctly that there were only 175 logs submitted in the 1986 Field Day? There were 24-hours to compete with 174 other stations. Here are the major criticisms of contesting in Australia, partly based on my own experiences and opinions, but reflecting the attitudes of other amateurs who have written and discussed the subject with me.

1 There are only three national HF contests — the RD, the John Moyle and the Novice — and each of them is crippled by some special parameter. The RD is on a WIA Divisional basis with scoring handicaps, the John Moyle penalises any operator who is not portable and the Novice penalises the full-call.
2 There are too few amateurs participating (see 3 and 4 below), particularly in CW sections.
3 The rules are too complex and serve to frustrate the operator and limit activity. Examples are the restrictive classes in the John Moyle, the inability to work anyone but VK/P29/ZL outside ones own area in the RD, and the limitations on multiple contacts on HF.
4 The periods are too long.

The purpose of the National Sprints is to address all of these problems so that those who enjoy contesting have the best possible opportunity to do so in a truly competitive environment. Much can be said for and against contesting in principle, but a good contest provides real opportunities for sharpening operating skills, which will stand one in good stead if ones services are ever required in an emergency. Besides, it is (or should be) fun.

The CW Sprint will take place from 1200-1330 UTC, November 15, 1986, with the Phone Sprint over the same period a week later.

All CW operators are urged to participate in the CW Sprint and prove once and for all that it is not lack of numbers, interest, skills, or enthusiasm that have resulted in such low numbers participating in the major contests.

Also, I hope any "slower" operators or those uncertain of their skills will not be discouraged from participating. To this end I would remind all of you Brass Pounders that, if a slower station calls, you should go back at the same speed. Therefore, you slower ops should have no hesitation in calling the faster operators.

One last comment — because the Sprint is restricted to an hour and a half on 80 metres, it is fair to say that we will need a reasonable portion of the band, particularly in view of the fact that the novice allocation only includes 10 kHz (3.525-3.535 MHz) of the portion restricted to CW-only by gentlemen's agreement. We may have to put up with some flack from phone operators who think that 3.535+ is exclusive phone, but do not let it worry you.

Now, it might be appropriate to review some of the finer points of CW contesting. The following paragraphs will form a general introduction to the subject, and, I hope, encourage some otherwise timid souls to get their feet wet in what should be a valuable educational and practical exercise — the First National CW Sprint.

There are some fringe benefits to participation in a CW contest which make it attractive to the non-contesters among us — you can experience a wide variety of sending styles and speeds in a very short time, and significantly improve your "ear" or copying ability while you are at it. As with any contest, the basic point of the Sprint is to make as many contacts as possible, as fast as possible. Therefore, contest exchanges are cut down to the bare bones. The Sprint contest exchange requires call sign, signal report (RST), and a serial number. It will look something like this:

(Station 1) CQ TEST DE VK9ABC K — or (CQ SPRINT DE VK9ABC K)
(Station 2) DE VK5FN K
(Station 3) DE VK5NBG K (two stations have responded)
(Station 1) VK2DXP NR 5 N N TT8 BK
(Station 2) QSL UR NR 5NN 132 BK
(Station 1) R GL E E VK5NBG NR 5 N N TT9 BK
. . .

There is not much to it, is there? And, when you consider that most of these exchanges take place at 20-30 WPM, or faster, the contact rate can be very high indeed.

Looking at the sample exchange piece by piece, the first element is the CQ Contest Call. The call should consist of the CQ TEST or CQ SPRINT, followed by your call sign and K, sent once only. Allow only three or four seconds for a response before repeating.

The answer to a call should be simply DE followed by your call sign. This presumes that, if you answer on the same frequency, you must be answering the CQ. But be sure you **are** on the same frequency (see the *ARRL Handbook* or *Pounding Brass*, August 1983).

The station calling CQ should send the responding station's call sign once (because there may be several stations answering) and will then give the signal report and serial number. Repeats are usually not given unless requested. Signal reports are usually given as 5/9/9 regardless of the facts of the matter, and I shall refrain from making any further comment on that subject aside from noting that reports were not even required in the 1985 RD.

Nines and zeros are coded because they are so common (N=9, T=0), so an exchange of 5/9/9 008 would be sent as 5NN TT8. The break signal BK (— . . . — . —) is then sent to invite the other station to transmit. Often it is sent as B (space) K, and sometimes K is used by itself. Sometimes, the break is preceded by "QSL?".

The second station then sends "QSL UR NR 599 132 BK".

As is the case in phone contests, it is up to the station which called CQ to send any pleasantries, such as GL E E, and he may or may not listen for an acknowledgment (E E) before calling the other station (if he copied both call signs), or calling CQ again.

Unlike most CW activities, successful participation in a contest does not depend to any great extent on your copying speed for "normal" CW. You can generally work a station calling CQ at twice to three times your normal copying speed. Firstly, the format is so standardised that all you have to pick out is a call sign and a number. You can listen to two or three calls before answering in order to be sure of the call sign; you can listen to the next contact the person makes in order to verify the number. Secondly, asking for a repeat is as simple as sending a question mark. For example, if you missed the number, you send "NR? K." Finally, although you may start out listening to CQ calls three or four times, it does not take long before you can pick them up first time. It is generally recognised that any five words-per-minute novice can recognise a single character at speeds up to 50 WPM; a string of three or four characters at 25 WPM is not difficult.

As far as sending speed is concerned, you should send as fast as you can and still be readable at the other end. But as I have said before, slow down to match a slower operator, or you will waste valuable time in repeats. If you want a contact (why else would you be in the contest?), be patient.

By all means, have a go at the Sprint, and I look forward to exchanging numbers with you.

73 till the 15th.

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Radio Amateur Old Timers Club

John Tutton VK3ZC
11 Cooloongatta Road, Camberwell, Vic. 3124

WINTER QSO PARTIES

The Winter VK/ZL QSO Parties took place on August 11 (7 MHz), and August 18 (3.5 MHz), the former in very poor conditions. It was quite an achievement to record a contact even in one's own call area, and a ZL was really something!

Consequently, very few saw out the whole period of the party, and it was as good as over by half time.

VK3JA, on CW only, had the most QSOs (15), while VK3VF (14) had it most on combined modes. Most of the SSB operators gave in to the QRN.

On 3.5 MHz, it was a much better picture with skip troubles being negligible, but still some QRN — the main trouble was people forgetting the Party was on!

VK3JA was top again with 24 QSOs, this time on CW and SSB. VK3YW with 12 QSOs was top CW-only.

Discussions are in train with ZL regarding next year's Parties and you will be kept posted in these columns of any changes.

	7 MHz		3.5 MHz	
	QSOs	TOTAL	QSOs	TOTAL
VK3JA	15	600	24	1080
VK3VF	14	490	18	900
VK3KS	12	360	21	840
VK3XB	12	360	21	840
VK4AIX			18	720
VK4OX			16	640
VK3YW	4	80	12	360
VK3XF	8	160	13	325
VK7RY	6	120	12	300
VK2AWA	5	50	10	250
VK3RJ	10	250	9	135
VK3ZC	10	250		
VK3AMD	8	160		
ZL3BJ		100		880
ZL2US				490
ZL2AT				420
ZL1DD				350
ZL1LR				300
ZL4AI				300
ZL1JX		75		235
ZL2AB		50		225
ZL2BD		250		
ZL2BU				140

Check log received from VK5KV

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Club Corner

GOLD COAST AMATEUR RADIO SOCIETY

The Ninth Annual Gold Coast Hamfest will be held on November 22, 1986, from 9 am to 6 pm. The venue will be the Albert Waterways Complex, Broadbeach, near Jupiters Casino and Pacific Fair. This year's Fest will be bigger and better than ever. Everyone welcome.

—Contributed by Ken Ayres VK4KD, Chairman Organisation Committee, Gold Coast Annual Hamfest

DEVIL NEWS from the North-West

Last meeting saw 22 members and four visitors, one being VK7NAE from the North. It was good to welcome Owen VK7OL, back from his 3-4 month tour on the "big island." Owen and his wife, Nancy had a most enjoyable holiday.

The repeater, VK7RAD, on 146.625 MHz is now on site and operational. The repeater is run by solar power and is being turned off at night because the cold weather turns it on and leaves it running all night. Andrew VK7ZAP, turns the repeater on prior to going to work in the morning and off again at night. This on/off routine will continue until he has time to go to the site to make some adjustments to the unit. These adjustments have to be made when the temperature is minus-four degrees, so it is going to be an unpleasant task. If the repeater is abused to the extent that it is unable to be used or normal use, it will be turned off completely until the adjustments are made! A special thanks is extended to all the amateurs who have participated in the repeater project.

Greg VK7ZBT, was most embarrassed when someone let the "cat out of the bag" and the members sang Happy Birthday to him.

Further discussions took place in reference to Camp Quality, and a committee has been formed. Further information may be obtained from John VK7ZPT, Noel VK7EG or Tony VK7AH.

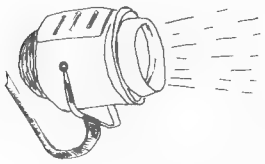
The club station has still not been on-air from its new QTH, as members have had other commitments, however it is hoped things will be underway shortly.

The club realised $100 from the auction mentioned in last month's column. As this was so successful, there will undoubtedly be another one the future.

Arthur VK7SE, is in need of operators to do News Broadcast Relays — volunteers please contact Arthur.

QSLs are still very quiet.

The evening concluded with a most interesting computer display provided by VK7s RN, MB, NAE, ZAP, KAB and AH. Each had different programs and some had printers and disc drives.



Spotlight on SWLing

Robin Harwood VK7RH
52 Connaught Crescent, West Launceston, Tas. 7250

Well, 1986 is rapidly drawing to a close. What a year it has been for me personally. Little did I realise just 12 months ago that my life and status would radically alter. It has been an interesting, but disappointing year, as far as the radio conditions are concerned. It is taking longer to get out of the trough of the current Sunspot Cycle, although I think we are slowly climbing upwards.

By now propagation on the higher frequencies will have improved, allowing signals from Europe and the Middle East to come in during the late evening hours. Hopefully, conditions on 10 and 15 metres will also pick up, I am certainly looking forward to trying them from my new QTH in West Launceston. I am writing this in mid-September, so I have not had time to fully evaluate its potential. I have been encouraged so far, with observations made from a trap marine vertical antenna.

It is interesting to note the difference between vertical and horizontal polarisation on propagation. I do hear signals much earlier on the vertical than on the G5RV, while the horizontal is superior on signals much closer to Australia. It is very interesting to make comparisons between the two.

There has been a consistent rumour going around that KYOI, in Saipan, is reportedly being sold to the "Christian Science Monitor." You may recollect that this organisation has had plans to commence a shortwave broadcasting service from a site within the Continental US. KYOI mainly broadcasts pop music to Japan. This station got into financial difficulties, because the expected commercial sponsorship did not eventuate, so they have appealed on-air for the listening audience to send in donations to keep it going. They have raised US$20 000 from this unusual source of fund-raising, still not enough to meet KYOI's debts. At deadline time, KYOI was still there on 15.190 MHz with its usual staple of "rock" with announcements in Japanese and English. Thanks to Arthur Cushen and the *DX Post* for the above information.

According to a report on *Media Network* from Jonathon Marks at the ERATO Electronics Fair in Amsterdam, Kenwood will be releasing a new table- top communications receiver, either later this year or early in 1987. The R5000 model will reportedly have 100 memories plus keypad tuning with an optional speech synthesiser. Price quoted was about US$1000. Looks as if Sony and Icom are going to have some stiff competition to their models that have similar features.

Just a few weeks ago, I took my R70 receiver down to our holiday home at Weymouth, which is located on the northern coast of Tasmania. Predictably, I was able to hear many more signals, particularly on the medium frequencies, away from the strong local stations on 1.008 and 1.098 MHz. I was fortunate in hearing, what I suspect was an American MW station on 1.120 MHz, with pop music. There were plenty of others also with pop music, but I was unable to ascertain where in the Pacific they were located, although they were not Australian or New Zealand stations, because they were on 10 kHz steps. Plenty of Asian signals as well were audible, under domestic AM stations. 1.440 MHz provided quite a number, as no Australian stations are allocated there. Later on, the powerful 1200 kW sender in Saudi Arabia is easily heard, even on a transistor portable.

Yet another highlight for me was the reception of long-wave signals. That is the broadcasting stations that are allocated between 150 and 300 kHz, mainly located in Europe and the USSR. There was a signal on 236 kHz with the *Mayak* program, the second Soviet domestic network. By checking with the current WRTH, I was able to ascertain that it was located in Siberia with a power of several thousand kilowatts.

So I tuned down even lower to see what else I could hear. Imagine my surprise to hear TTY tones on 145, 137, 134 and 127 kHz respectively. They were not strong but there was little QSB. If it had been HF breakthrough on the R70, I would have noticed the rapid QSB. These presumably are military signals with high power.

But it did not end there, as there were consistent TTY tones around the clock on 45 kHz. The other TTY senders were usually observable in the evening hours, yet the 45 kHz signals were consistently there. Then it dawned on me — the Navy has been transmitting on that channel for many years from Belconnen, Australian Capital Territory. So I have been surprised by the performance of the R70 on the LW bands in remote locales well away from nearby MW senders. Hopefully, in the future, I shall be able to go on another "DXpedition" and really enjoy listening.

Before I do forget, I have received a request from two international broadcasters for technical reports of their broadcasts to Australia. Both have been experiencing difficulties and would welcome critical reports on their transmissions. The first one is Radio Veritas in Manilla, Philippines. This station recently acquired some new senders to replace the previous ones, which were sabotaged by pro-Marcos forces during the revolution earlier this year.

They are at present on in English twice daily. From 0130 until 0155 UTC on 11.730 and 15.275 MHz and at 1500 to 1530 UTC, they are on 9.565 and 15.120 MHz. They are especially keen to get reports from Australia on their new transmitters. Their address is:

Radio Veritas
English Service
PO Box 939
Manilla, Philippines.

The second station requiring assistance with reception reports is the External Services Division of All India Radio. They are broadcasting to Australia from 0900 until 1000 UTC and at 2045 until 2230 UTC and these transmissions are a part of the General Overseas Service. The frequencies for the evening schedule are 11.810 and 15.335 MHz while the morning release is on 9.550, 9.910 and 11.715 MHz.

Reports should be sent to the Director of External Services, All India Radio, PO Box 500, New Delhi, 110001, India.

The BBC External Services have given Marconi Communications Systems a contract to supply equipment and antennas for their new relay in Hong Kong. It is due for completion early next year and will improve the audibility of the BBC World Service in northern and eastern Asia. The transmitters will be 250 kW incorporating *Pulsam* modulation and will have remote control via a digital data link. There will be four multiband curtain arrays with mode/slew switchings. This should give DXers a chance of obtaining a new country before the Territory reverts back to China in 1997.

Well, that is all for this month. Until next time, the very best of DXing and 73.

—Robin VK7RH

RETIREMENT

Roy Neal K6DUE, (seen on Australian television particularly during the "Amateur in Space" has announced his retirement from his position as West Coast Bureau Chief of NBC Network News.

Although he will remain with NBC on a consulting basis, Roy plans to devote much of his time to making personal appearances and lecturing on the space program and allied topics.

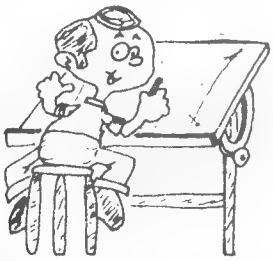
In addition, he plans to be involved in various television projects through his own company "Talent Connections." Included will be at least one new production on his favourite subject: Amateur Radio.

—From *The ARRL Letter*, September 15, 1986

CLUB PORTRAIT

GIPPSLAND GATE RADIO & ELECTRONICS CLUB

Jim Linton VK3PC
4 Ansett Crescent, Forest Hill, Vic. 3131



Formed by radio amateurs in the Dandenong area of south-east suburban Melbourne, in 1977, the Gippsland Gate Radio Club, in June 1986, changed its name to include the word *Electronics* and moved in a new direction.

While keeping its original aims of promoting amateur radio in all its forms, the Club has now included the fields of digital electronics and computers. A Club information bulletin states: "The hobbies of radio and digital electronics are inseparable and we now provide the opportunity for hobbyists and experimenters in each field to expand their horizons."

GGREC Publicity Officer, Kerry Clayton VK3KFC, says there was a falling interest in club activities among local radio amateurs with a general trend of non-participation. At the same time there had been a narrowing of interest toward computers among the Club's 20-odd remaining financial members. Despite considerable effort the Club was unsuccessful after 12 months of trying to recruit newcomers into the hobby of amateur radio.

The GGREC's committee carefully analysed the state of amateur radio, where the future was heading and how best to reshape the Club in line with perceived trends.

Kerry says that among the Club's members there are some very talented people in the computer field and most, if not all, have computers and are heavily into RTTY, both glass and mechanical. He says a decision was made to streamline the committee and broaden the Club out into the electronics field.

Kerry says; "There is an incredible interest shown by school children, and teenagers, in the electronics and computers so we figure we will try to attract them and convert a few along the way to amateur radio." He says it is a two-way thing — the existing club members will also learn from the youngsters — in the schools the children teach the teachers about computers, now!

He considers the era of electronics and computer hobbyists among youngsters has not been generally recognised by the amateur radio fraternity.

GGREC is going out into the community (including visits to other clubs) and using whatever media it can to make itself known as a club for anyone interested in computers, electronics or radio communications.

Kerry says, "We are certainly going into the field — offering ourselves to retailers for in-store promotions of their products and publicising the Club at the same time."

He admits the drive behind the public relations activity is one of survival — the Club's future viability depends on it. Kerry also says he believes the bottom of the sunspot cycle, with its poor top end HF propagation has contributed to the lack of interest in amateur radio. The amateur radio fraternity must be prepared, he warns, to take advantage of any increased interest in radio communications, such as through CB radio, when readily available HF DX returns.

The Club ran test transmissions in 1984 to check propagation for a planned six metre repeater, but this project waned due to transmitter problems, however, it is the GGREC's long-term aim to get the project going.

A highlight of the GGREC calendar is the Alexandra Apex Club Cross-Country Horse Trial in April each year. The Club is famous for the communications facilities it provides for the event held in very rugged mountain country near Rubicon, in northern Victoria. This includes check-point reports safety communications and a computerised results service.

GGREC has clubrooms in the 1st Oakwood Park Scout Hall in Heyington Crescent, Dandenong, which includes its club station, VK3BJA, and a test equipment library. Some members also have access to test equipment which they make available.

Help is always there for anyone who wants to build a kit, (and there are many now available through various sources) or to rescue someone having difficulty in making a construction project operational.

GGREC publishes a bimonthly newsletter called *Gateway*, and membership is concentrated on a line between Dandenong and Oakleigh, with a few living in Cranbourne. However, where you live does not matter, if you think the Club suits your interests the GGREC will greet you in a warm friendly manner as either a visitor or member.

Meetings are held at 8 pm on the third Friday of the month, chosen purposely to avoid clashing with other metropolitan clubs which usually meet on the second and fourth Fridays.

Visitors are made most welcome or inquiries may be made to Kerry Clayton, PO Box 98, Dandenong, Vic. 3175 phone (059) 96 3580.

ar

Write an Article for AMATEUR RADIO!

Ian J. Truscott's ELECTRONIC WORLD

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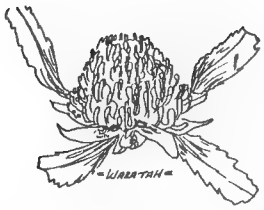

VK2 Mini-Bulletin

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
Box 1066, Parramatta, NSW. 2150

BROADCAST NEWS

On September 14, VK2WI changed their 160 metre frequency to 1.845 MHz. This has removed it from the Band Plan DX segment. We have found that even with two broadcasts on Sunday there are some who do not hear either. To assist those unable to hear a broadcast, a recorded message will be available on the Dural telephone from Monday to Saturday; (02) 651 1489. It will be about two minutes duration, with major points from the Sunday broadcast. It is based on a similar service provided by the RSGB to their members.

NEW COUNCIL MEMBER

Due to changed circumstances, Mary Jane Douglas VK2CMJ, was unable to continue on Divisional COuncil. Her position for the remainder of this year will be filled by Mike Burns VK2AUE.

NEW MEMBERS

We would like to welcome the following who joined the Institute during September. E A Brennan VK2FLP, Lemon Tree Passage and E J Lawer VK2NNJ, Keiraville.

COMING EVENTS

The *Conference of Clubs* is being held on Sunday, November 2.

The next *Trash and Treasure* sale will be held at Amateur Radio House on Sunday afternoon, November 9, at 2 pm.

The next *Divisional Seminar* will be held about March 1987.

DECEASED ESTATES

There was fair response to the items in *Hamads*, September. There was one error — the receiver shown should have read FRG 7700. Because of the error it is being re-offered. Condition is fair with some slight marks on the case. Tenders for this item will be received at the Divisional Office up until 2 pm on Thursday, November 13.

WICEN

A new repeater for 7150 has been assembled by Jeff VK2BYY, for Chatswood. This is now in service. The site is starting to be built out with the continued development of the region.

DATA SHEETS

We have recently been able to obtain several data books from which we are able to offer members a photocopy service. Written requests only, maximum three devices and include a 50 cent stamp to cover postage costs. Further details are given on the Broadcasts.

ROSS HULL CONTEST

See the Contest Manager's comments in recent ARs. This contest needs the support of VHF/UHF operators if it is to be continued.

VK4 WIA Notes

Bud Pounsett VK4QY
Box 638, GPO, Brisbane, Qld. 4001

RALLY AUSTRALIA AWARD

The Redcliffe Radio Club has devised a very new concept in amateur awards. You can claim this award by making a trip around Australia without leaving your shack. With the price of petrol these days, that will make it very attractive.

For full information regarding this award, please see page 45, September AR.

QUEENSLAND NETS

Further to the list of nets in Queensland:

RADARS Net: Roma and District Radio Society, 3.610 MHz, Friday at 8 pm, except the third Friday of each month.

Mount Isa and District Amateur Radio Group: 3.610 MHz, Tuesday at 8 pm, VK4WII.

Brisbane Amateur Radio Club: 28.445 MHz, Monday at 7.30 pm, VK4BA.

Sunshine Coast Amateur Radio Club: 3.595 MHz, Thursday at 7.00 pm, except when Christmas Eve, Christmas Day, or New Year's Eve falls on a Thursday. Call sign of the control station is VK4WIS.

A watch is kept on 28.400 MHz for five minutes also. The Club makes every reasonable effort to vacate 3.595 MHz before 7.55 pm, so as not to cause interference to the Oxley Radio Club (VK2) and the Bendigo Radio Club in VK3, who begin nets at 8 pm on or about this same frequency.

Amateurs in other parts of Queensland and in other States can take advantage of these nets to collect points to the various club awards.

—Bud VK4QY

VK3 WIA Notes

NEW MEMBERS

The following applications were received for the month of August 1986, and were accepted by Council on August 28, 1986.

Christopher Avram VK3YCA; Robin Brading VK3KRB; Jack Burgesson; Cleaver Duell VK2MUA; Ian Harrison; B Kiernan VK3PHK; Thomas Lee; Sakari Mattila OH2AZG; Richard Orford; Evan Vogele; and Anthony Linton.

EXAMINATIONS

The next DOC examinations will be held on Tuesday November 18, however the last day for applications to be submitted to the Department was October 8.

Examination and closing dates for 1987 are as follows:

EXAM	CLOSES
February 17	January 8
May 19	April 8
August 18	July 8
November 17	October 8

QSP

PHASING OUT OF VNG AUSSAT TO TAKE OVER?

We hear from authoritative sources that the well-known time signals on 4.5, 7.5 and 12 MHz are to be discontinued from the end of October. Users from many services have come to depend on VNG. In particular, 7.5 MHz is a prime calibration frequency for all electronic equipment. No notice of the impending shutdown has been given to most users.

The station which has transmitted these time and frequency standard signals is located at Lyndhurst, near Melbourne, Victoria, on the site where the transmitters of the High Frequency Inland Service are also located. The antennas occupy a large area owned by the Commonwealth. The land has been rural, but it is becoming residential and is situated on a four lane highway.

Telecom, who provide the transmitters for the ABC, have been reviewing the need for the VNG service, since the advent of AUSSAT satellites has made the HF Inland Service redundant. Telecom itself no longer has any need for VNG, but is willing to provide a replacement time and frequency service to those who may still require it. This will be over its normal landline circuits at normal commercial rates.

The authorities claim that VNG is now superfluous and obsolete. However, other organisations are invited to take over if they perceive a continuing requirement, but it is pointed out that updating to a new "state-of-the- art" transmitter may cost up to $1.5 million. The annual cost of operation and maintenance is estimated at $100 000. Telecom considers it uneconomic to continue the service on the present frequencies when alternatives are available.

But what alternatives are economically available to amateurs, yachtsmen, light aircraft operators, and others dependent on accurate time signals and frequency calibration references?

Comments have been requested from a small list of users or potential operating successors (all Government departments) but on a time scale such that the average small user has not even had time to learn of the impending shutdown, let alone assess the situation and supply adequate information to the authorities.

The well-known time, propagation and frequency services station WWV in Boulder, Colorado, and its subsidiary WWVH in Hawaii faced a similar fate a couple of years ago. Many protests from amateur, marine and other services convinced a Senate Committee to reconsider. It was persuaded that the service was of benefit to all users, was a necessity, and could be a life-saver, particularly for mariners calculating their positions on the high seas. Consequently, the WWV/WWVH service still exists.

We appeal to the Minister for Communications, the Hon Michael Duffy MP, to reconsider and allow VNG to be heard on its present frequencies at least until adequate notice is given by appropriate gazettes and newsletters. Please allow sufficient time for interested parties to reply regarding the retention of a service essential to the Pacific and Indian Ocean areas. Your concurrence in granting an extension before its extinction may save lives at sea. Without this service many who depend on it for accurate time are "flying blind." We feel that much more forethought should have been given to its deletion, and that all present users should be given time to register their comments.

NEW TEN-TEC TRANSCEIVER

The new amateur HF transceiver, called the Paragon, will be available in 1987, and will cover all amateur bands from 160-10 metres and receive continuously on all frequencies from 100 kHz to 30 MHz.

The rig will contain dual VFOs, plus offset receive tuning, a speech processor, noise blanker, full or semi-breakin, notch filter, passband tuning, and an audio filter.

There will also be a 62-memory capability and will operate CW, SSB and AM. FM capability will be optional.

Five-Eighth Wave

Jennifer Warrington VK5ANW
59 Albert Street, Clarence Gardens, SA. 5039

I think the last week in August and the first week in September should have been designated "Community Involvement Fortnight" in VK5 this year. We really stretched both our volunteers and resources to the limit but in both cases the events undertaken went off without a hitch.

The events were, of course, the WICEN communications provided for the State Bank Discovery Trial (Round-the-State-Car-Rally) and the Display Station and allied events at the Marion Library to celebrate the centenary of the Marion Council District. I will not give a full report here as John Hampel VK5SJ (Marion) and Bill Wardrop VK5AWM (WICEN) will be doing that in a forthcoming issue of AR. (I believe John has booked several pages in advance, and our thanks to Maria VK5BMT, for volunteering to do the typing).

Actually, it is at times like these that you discover who your true friends are and it is a wonder that I am still talking to John Hampel! On one of the days that I spent down there helping to operate the Display station, after a hard day talking, both on and off the air, I climbed wearily into my car to discover a parking sticker under my windscreen wiper (this in a private car park between the Library and Council Chambers). On reading it, I discovered it was not a legitimate one, but one making rude remarks about my parking ability (which I might add were quite unfounded!). It was not until several days later that I discovered that John was the perpetrator.

Not content with that, at the reception which the Mayor of Marion gave for those of us involved, John said a few words in answer to the short speech which the Mayor made thanking us for our involvement. Before I realised what was going on John had ". . . invited the President of the South Australian Divi. . . . .to say a few words." (no word of warning beforehand). So (clutching at straws) I spoke about how we as amateurs like to feel that we can put ourselves and our equipment to good use for the benefit of the community in general.

This may not be true of everyone but I feel that it is true of the majority and was certainly in great evidence with the WICEN activity and the Marion Display. As for John, well, how can you stay mad with someone who put in so much time and effort both planning and manning the show?

The Around-the-State 'hook-up' on the Tuesday evening, when mayors from all around South Australia congratulated the Mayor of Marion, via amateur radio, as did Mrs June Appleby, MP, the Member for Hayward, was one of the finest pieces of net controlling and organisation that I have ever seen — congratulations John, and thanks.

Out thanks also go to Bob Murphy VK5MM, (better known as Mickey Mouse, and one of our Life Members) who hosted Mrs Appleby, Doug Head VK5NDH, (who was our official photographer for the evening — thanks Doug), and myself, in his shack. Thanks again Bob, and now that we know the rig works, we look forward to hearing a lot more of you on the air.

The WICEN event created a monumental headache for both the two principal characters. Bill VK5AWM, our WICEN Director, had to find amateurs to operate all the rally checkpoints, many of which required four-wheel drive vehicles to get to them. Joy VK5YJ, on the other hand, only had to get people to drive as far as Hindmarsh to operate the Base Station. The catch was that she needed enough people to cover a period of 24 hours for eight days. No mean feat! I mean to say, where *do* you find people mad enough to volunteer to sit up all night; I was still wondering this as I watched the sun *rise* as I drove home on Tuesday morning, having shared the shift with Joy and my son, David VK5ZHB. I also wondered what the neighbours would think as I arrived home at 6.30 am!

To all those volunteers, whether they did the night shift or the day shift; to all those who drove 100s or 1000s of km, sometimes in the rain or freezing cold. To those who lost sleep or gained blood-pressure worrying over the organisation; to all those people right across the State who were involved in either of the two events and to John VK5SJ and his team, who put together the displays and events connected with Marion, we say a huge —

THANK YOU!

DIARY DATES

November 1 — Buy and Sell, an all day event at Westbourne Park Community Hall, Goodwood Road, Westbourne Park. Organised by the Adelaide Hills ARS.

November 15 — National Sprint CW Section.

November 22 — National Sprint Phone Section. (It is only for one and a half hours on each date, so why not be in it?). Annual Picnic, no information at time of going to press, so keep your ear-tuned to the Sunday Morning Broadcasts.

November 25 — General Meeting (also no information available at time of going to press).

December 9 — Christmas Social at 7.45 pm. "Looking Back at Radio in SA — and audio history." Produced and presented by John Hampel VK5SJ and Gordon Welsh VK5KGS, with the help of Kevin Kitto and the Glen Lea Singers. To be held at the Woodville Community Hall, Woodville Road, (between Port Road and the Council Chambers). Bring your lady and a plate of food.

JUBILEE 150 AWARD

Firstly, a correction and an apology. In an earlier list I said that Certificate No 329 was issued to VK2XV. I am not sure where I got that call sign from, but it is definitely my error as Certificate 329 was issued to Les McIntyre VK3XF. My apologies Les, and I hope that it did not cause you too much inconvenience or embarrassment. Now for the latest award winners.

485	VK2APE	490	VK2VYS
493	VK5NSI	494	VK2DUP
497	VK4SK	498	VK3ABP
502	VK1DW	504	VK4KHZ
507	VK2PKW	510	VK5ZAH
513	VK5BWF	515	L20508
518	ZL4QX	519	SWL/ ZL1-261
520	VK3SM	522	VK2MUZ
524	SWL/ C Holz	525	KJ4SY
526	XE1JIW	527	L50126
528	KE5VH	529	NG8Z
530	K0CNM	531	N7GWA/ VE3
532	CP5LE	533	KA5WAD
534	KA5WAC	535	VE4ANA
536	W0LEO	537	WN5W
538	N6OBW	539	N8FXL/ M8
540	N7ILF	541	KB4AQI
542	KA9TIA	543	K6KYN/ 7
544	WA2PJI	545	VE3FII
546	KA5PGE	547	WA5Q
548	WA0GUD	549	WD4RAF
550	KA9UVK	551	KA9UCX
552	K4IOT	553	W0HNW
554	WB7TUY	555	N0GMB
556	K5QXY	557	KA9LZP
558	K5LVZ	559	KA5AYJ
560	W6ENZ	561	KB4NRZ
562	W6UVW	563	WA2REC
564	N0FRT	565	ZL1NU
566	WA2RXS	567	W7VIH
568	KD0VY	569	K5TLP
570	W4LQF	571	KA7CPZ
572	KB5AID	573	KA5OOC
574	N5HWI	575	N6NLA
577	PY2ZJ	578	LU1CIZ
579	CE1FGT	580	9Y4MJK
581	PY2ZBO	582	W7NTM
583	N8GUD	584	WA8BIJ
585	N3ASJ	586	K2CZT
587	KB2AYK	588	WF-MOJ
589	WA8IMF	590	KD9HK
591	KA2FAJ	592	W5KMZ
593	WB5OGD	594	N1BTE
595	KA5UAA	596	N0HJF
597	KA9TCR	598	KD9JB
599	AA4ON	600	KA1LLH
601	KA1LXT	602	KF5DX
603	W8IWJ	604	K1VNS
605	KF5HZ	606	KA1BLP
607	W5UOM	608	N5JHI
609	WD8REC	610	CE6GDN
611	W0ZRA	612	N4KWV
613	KE5ES	614	N9EZV
615	VK3PHK	616	VK5GAS/ 2nd Op
619	VK4VR	620	VK2EXA
621	WD5CUG	622	N5APB
623	N8CKV	624	KA7YPD
625	N1DYN	626	KA5MIJ
627	KA1HUS		

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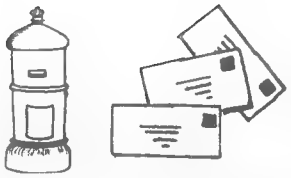

Over to You!

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

JUST A LINE . . .

Just a line to say you put out a fine magazine.

73,

Ed Rumming ZL1TG.

CHUCKLING ENJOYMENT

I enjoyed the article on Direct Conversion Receivers by VK3XU. It is a long time since I built a receiver.

I chuckled at the answers given in *Technical Mailbox*. Might as well be gossiping over the garden fence. . .The reader knows almost exactly what the writer said. Good show!

Yours, 73,

Don Law VK2AIL,
RMB 626 Adelong Road,
Tumblong, NSW. 2729.

DISCUSSION PAPER

With reference to the recently published Linton-Harrison paper on future trends in AR and the replies which followed; many readers seem to have overlooked the possibility of allowing digital modes on the Citizens Band Radio Service (CBRS). Instead of reducing the levels of entry into the amateur service to increase membership, why not allow the "Computer Whiz Kids" to discover two-way radio the cheapest and easiest way.

The small percentage who would be potential amateurs will soon discover the differences between both services. If AR information is available via computer bulletin board services and published in computing magazines the exposure would give us the boost in numbers we require.

The CBRS consists of 40 channels using AM/SSB at 27 MHz and a further 40 channels using FM at 476-477 MHz. Experience on these bands goes a long way in preparing users to enter our 10 metre and 70 cm amateur bands.

I believe the expense of advertising would be minimal compared to the administration problems of new licence-grades, examination syllabuses, band plans, etc. A minor change by DOC to CBRS conditions of use to include digital modes would appear to be the logical answer.

73,

Steve Stephens VK4KHQ,
PO Box 2154,
Mount Isa, Qld. 4825.

INCREASE OUR NUMBERS

Over the past few months, there have been a variety of ideas put forward as to ways in which we can measurably increase the number of amateur radio operators in Australia. A lengthy detailed paper on additional entry points, etc to the amateur radio ranks was presented by Jim Linton and Roger Harrison; and Gordon Bracewell presented another less radical concept in August AR. In *Over to You* in August AR, Ted Gabriel presented another concept and from my experience his conclusions are more in line with how things are in the real world. This is not to knock the earnest efforts of Jim, Roger or Gordon as we do need more amateurs if our amateur bands are to be retained.

We are very much in a cleft stick, do we drop our standards and admit anyone who can sign their name or do we stick to reasonably high standards and have not enough amateurs to justify the retention of our amateur bands? It could be asked whether we do need all our bands — who works 10, 18, and 24 MHz for example? Do we need all of 28 MHz, or all of 50 to 54 MHz, maybe 50 to 52 MHz is enough?

The concept of computer buffs being granted a digital type of licence has, on the surface, considerable merit, however, would such a licence be a means to an end? I believe that it would; it is much cheaper over long distances to use radio communications than to use the Telecom system. The aim of the computer buffs is to transfer digital information from point A to point B, the intricacies and interest in the actual radio communications is not where their interest lies. Their interest is in the arena of computers and the software that goes with them. Some would find the radio communications interesting and take up amateur radio in the way that we understand it.

Digital communications is certainly one of the up and coming ways of communicating but I do admit that I like to talk to most operators rather than using CW (a form of digital communications). With the latest forms of digital communications, would the operator know or care if his transmissions caused considerable disruption to other types of communications, in fact if the licence was of low standard technically would he or she even be aware that they were causing interference?

Yes, there probably is a place in the spectrum for digital computer buffs to transmit their messages, perhaps in a band alongside one of the amateur bands. I believe the computer buffs operation is as compatible to amateur radio operation as CB operations are. They are different users of our radio spectrum and, as such, each needs their own specific sector.

How do we get more people into amateur radio? If the Victorian Football League (VFL) cannot get people to go to football matches in sufficient numbers to make it monetarily viable for them, I do not like our chances of doing much better. It must be remembered that there are more and more leisure time activities being dreamed up to fill in our time, and there are only a finite number of people to take part in these activities. After all, about 15 years ago we had one amateur per 2000 of population, we now have one per 1000 of population so we haven't done all that badly.

About the only way that we can expect to get more people into amateur radio is to publicise it more and then guide those who show some interest in knowing more about it. Anyone who is really keen will not find the novice examination unduly difficult. However, many people do experience difficulty in passing the exams because they have faulty learning methods. Many just learn parrot-fashion the correct answer from a group of four in their book of 1002.5 questions with answers. They think that once they know this book off by heart that they know plenty about radio communications — whereas all they know is the answer to all those questions, and probably not the answers to the same questions asked in a different way at the examination. I would suggest that tutors teach and prospective amateurs learn, about radio instead of how to answer questions and they will have considerably more enjoyment out of their hobby because they will be able to understand questions and reason out an answer.

Yes, these books of questions and answers do help but the best thing is to read the questions. Don't look at the answers. Work out the answer, which may mean referring to your text books and then looking at the four answers. You will learn much better that way. This lack of knowledge really hit home when I was talking with a chap in his early 20s who was to sit for the novice licence. I showed him a circuit of a very simple power supply, transformer, diode, capacitor and bleeder resistor and asked him what it was. He replied he did nt know and that he might learn about circuits after he got his ticket? ? ?

Enough said. Let us not drop our standards any lower.

Yours faithfully,

Rodney Champness VK3UG,
31 Helms Court,
Benalla, Vic. 3672.

APPRECIATION

On behalf of the *HMAS Castlemaine Group,* I wish to convey my appreciation and congratulations, on the September issue of *Amateur Radio.*

Considering such short notice, the production team have created, what I consider, to be one of the finest pictorial covers yet. Reproduction from the postcard especially surpassed my hopes and expectations. I have already had feedback from friends interstate, who feel it is worth framing. I myself have sent copies to USA, UK and New Zealand.

Many thanks for the opportunity to publicise the *Castlemaine Award* in this special year for the RAN and the ship. It is, by far, the best "exposure" we have had. I know many an ex-Navy amateur will be thrilled to see evidence, that a part of our Maritime history is "alive and well."

My best wishes to the team.

Kind regards,

Margaret Nally VK3QU,
Castlemaine Group Manager — VK3RAN,
PO Box 144,
Elwood, Vic. 3184.

HELP REQUIRED

Some time ago my wife Johanna DL4AAG and I, decided to try to leave Europe with out two little children.

My first problem is to find a position as a physicist in an industrialised country, where the people may need someone to work in the radio frequency and microwave area (industrial research, antennas, equipment design, computer-aided measurements). A job including scientific programming (Fortran, Algo1, PL1, Pascal) and/or teaching would also be very welcome.

We thought of Australia, of course, and that among the members of the WIA there may be professionals who can give me the names of companies and institutions that may be interested to receive my resume.

Many thanks in advance.

With best regards,

Klaus Munter DC6XE,
Fuchsweg 17,
D-3300 Braunschweig,
Germany FR.

SELDOM COMES TRUE

I was interested in reading the article in AR of July 1986, *Prophecy from the Past.* Reading it a second time it came to mind that a prophecy seldom comes true in the lifetime of the person who made the prophecy.

It made me think of my article in AR of October 1947, in reporting my QSO with W7ACS/KH6 on 50 MHz on August 26, breaking the then world record, and where I more or less prophesied that WAC could be possible. WAC on 50 MHz did occur many years later and, although I did not obtain that ambition, several of my world-wide friends did procure that distinction.

Your sincerely,

C H Castle VK5KL,
29 Turnbull Road,
Enfield, SA. 5085.

VHF/UHF CONTESTING

I would like to make some observations on VHF/UHF contesting in Australia. Based on a number of years of entering the Ross Hull Contest over the Christmas/New Year break, and various entries in the John Moyle Field Day and Remembrance Day Contest, there is a considerable amount of activity that does not appear as contest entries.

Also, the contest opportunities for limited call licensees are somewhat limited! The Ross Hull Contest is the only 'real' VHF/UHF contest and its aims are more suited to a handful of experimenters rather than to contesters! The two other contests available to VHFers — the RD and JMFD — have traditionally assumed that all contacts will be FM local, and thus score minimum points. There is thus minimal incentive to try any SSB DX — after all, you get the same points as a local FM contact. So, VHF activity just acts as a fill in between bursts of HF activity, or when the poor propagation reduces the scoring rate. There is very little point in trying hard for VHF DX.

In an effort to find out what happened in other parts of the world, particularly the United Kingdom

and United States, I checked through back- issues of *Rad Com* and *QST*. It was at this point that I became aware of 'squares' and the benefits that they brought, not only to contesting, but also to VHF/UHF DX in general. Alas, squares have been slow to catch on in the rest of the world, but that is slowly changing.

My overseas research started to show some interesting facts. UK and USA VHF/UHF enthusiasts have many contests available to them. Scoring is usually based on frequency and occasionally on distance, where distance is determined by locator squares. Some contests are single band only, and to overcome possible difficulties with propagation, are either of 30-40 consecutive hours duration, or spread over two weekends. The RSGB publishes a basic set of general rules for both HF and VHF/UHF/SHF contests, with particular contests selecting appropriate rules from the standard set. There is even a code of practice for contest operation. It is also interesting to note that not only are repeaters banned in ARRL contests, but also the use of repeater frequencies and the national FM calling frequency (146.520 MHz in the USA) are banned!

A new twist to the VHF/UHF contests in America was the introduction of locator squares into the Spring Sprints in April 1983. These are six hour contests, with different dates for each band. Judging by the reports of contest activity in *QST*, this has been an outstanding success. "This grid system is the greatest thing that has happened to VHF since the 'Twoer'" said KA1ECL. In fact, John Lindholm W1XX, of the ARRL Headquarters Staff, has said that the aim of introducing 'squares' was to be a motivation for greater activity on the VHF bands in the USA, since the CW and SSB portions of the bands are currently under-used.

In an article in *QST* entitled "VHF Contesting" John Lindholm discusses the various issues that have affected contests over the years. While this may not be directly relevant to the Australian scene, I believe there is one very valid comment: "The genealogy of VHF contests is that they are patterned after the HF contests." He quotes a number of 'band-aid' solutions to the problems of VHF contesting — contest exchanges and FM — and indicates that nothing less than an all encompassing review will revive the 'patient.' ". . . attempted solutions to perceived inadequacies of the VHF contest have been addressed by the repeated application of band aids. The patient bleeds profusely from every orifice, and instead of asking, 'Is there a doctor in the house?' we apply salve and send the poor soul back into battle for another run."

An ad hoc committee was formed (under the auspices of the Contest Advisory Committee) to look at the matter, with input called for from all VHF contesters. John finishes with the exhortation '. . . let's develop a comprehensive VHF contest program that will again enhance VHF operating activities . . .". Perhaps it is time we had something like this here?

The recent popularisation of the 'National Parks Award' in Victoria has sparked a number of expeditions to various parks, and has resulted in increased HF and VHF activity. Perhaps the introduction of 'squares' into Australian contests would have the same result? It might also be a way of eliminating some of the problems with the 'State' scoring areas currently used in the HF contests.

Another point that emerges from the overseas magazines is that the format of the contest exchange has been slowly changing. No longer is it the traditional RS/T plus sequence number, but may include geographical/locator information as well. Perhaps this is something that could be thought about for Australia?

There was some discussion on these issues at the last Federal Convention. Perhaps a committee of interested parties could be formed to report on VHF/UHF contests? Hopefully the above thoughts will stimulate some of the other keen VHF/UHF contesters to put pen to paper and perhaps we may conclude with some interesting contests in this part of the spectrum.

73,

Peter Gamble VK3YRP,
6 Bath Road,
Burwood, Vic. 3125.

SYDNEY/MELBOURNE REPEATER LINKING

The second and final meeting of the Sydney/Melbourne repeater linking interest group was held at the beginning of September.

The Trio-Kenwood Amateur Radio Club have permission to use the North Point Building for the Sydney end of the Sydney/Melbourne UHF linked repeater. This location will provide UHF mobile and hand-held stations easy access to the system. All the equipment required for the entire link is due to arrive in December.

Instead of forming a new group, the WIA Council has been asked to send correspondence to the existing Trio-Kenwood Club, who already have one approved UHF licence and are willing to assist with locating commercial sites wherever a gap may currently exist in the Sydney to Melbourne route.

This interest group has defined the project as follows and has requested the WIA Council to now undertake its furtherance.

The Sydney/Melbourne UHF Repeater Linked System is designed to foster the development of the 70 cm band by the linking of 70 cm repeaters for free- access amateur radio use. As such, the linking of repeaters on other bands to this system will not be encouraged except in the following special cases.

i To provide an emergency capability to extend the range of a repeater on any band provided this capability cannot be freely activated except by WICEN;

ii Free access by any amateur of any repeater outside the 70 cm band to the UHF Sydney/Melbourne link would require unanimous agreement of all clubs charged with maintaining the Sydney/Melbourne link.

Icom Australia Pty Ltd have offered to provide half the equipment for the national link.

Sam Voron VK2BVS,
2 Griffith Avenue,
Roseville, NSW. 2069.

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A high quality film available at a bargain price — AND after you've taken the first 24 shots, you'll find 3 more!

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QSP

GOVERNMENT TO PUSH COMMUNICATIONS EXPORTS

A strategy to develop Australia's communications equipment industry into a $600 M export earner by 1996 has been released by the Department of Industry, Technology and Commerce.

The enormous growth potential in communications has prompted special attention to the sector. The strategy follows six months of discussion with industry associations, combined trade union groups, Telecom, OTC and government officials.

—From *Electronics News*, August 1986

AIMED FOR EXPORT

Codan recently released what it believes is a world first in commercial HF transceivers — a frequency synthesised HF single sideband transceiver.

It features a 99 channel capacity — tunable anywhere from 2 to 18 MHz — with 100 watts output. Teamed with a fully automatic tuning whip antenna, the transceiver should offer increased flexibility to operators of HF networks.

Three years and a "seven figure sum" have gone into developing the transceiver with 50 percent of its R and D funds coming from the government's Industrial Research and Development scheme.

The Codan Type 8525 appears to have the strong export potential the government is hoping will become commonplace among local communications products.

The HF market, although somewhat saturated in Australia, is a growing market in developing countries, particularly Africa, the Middle East and South-East Asia.

Codan intends to satisfy local market needs first, then build up production as is begins a full scale launch of the product into overseas markets.

Australia is already the highest per capita user of HF SSB in the world. Due to a combination of the size of the continent and the lack of telephones in many outback areas. HF networks are the only practical means of communication for many Australians.

The fully automatic tuning whip antenna system further increases the units flexibility. Designed in conjunction with the Hobart-based antenna manufacturer, Moonraker, it features a sliding ferrite driven by a stepper motor.

—Compiled from *Electronics News*, August 1986

OVERSEAS BUSINESS

The Federal Government has given approval for Telecom to compete for general overseas consultancy and project management work.

The approval came by way of an amendment to the memorandum of association which applies to Telecom's wholly-owned subsidiary, Telecom Australia (International) Ltd (TAI).

Early in 1986, the government gave approval for Telecom to establish TAI so it could bid for telecommunications projects in Indonesia.

Telecom's managing director, Mel Ward, is the chairman of TAI and K V Loughnan is its executive director.

The Communications Minister, Michael Duffy, said Telecom's experience in the development of long distance rural telecommunications systems could be of benefit to developing countries.

He said that Telecom and its predecessor, the PMG's Department, had a long history of providing consultancy services and technical assistance to many countries, but these services were provided by way of secondment of officers or under Australian aid programs, in particular the Colombo Plan.

"Telecom's skills are highly regarded by both the World Bank and the Asia Development Bank.

"Export opportunities for the telecommunication manufacturing sector should open up a result of TAI's efforts.

"For example, Telecom and NEC (Australia) had signed an agreement to market and sell Telecom's digital radio concentrator system to China and Pacific countries." he said.

—From *Electronics News*, August 1986

Obituaries

GEORGE MEATON VK4ASQ ex-VK2APM

On August 13, 1986 amateur radio, both local and DX, lost a valued member when George passed away peacefully at his home, aged 70.

George enlisted in the AIF when he was 25-years-of-age, as a Batman, but he quickly sought a course in signals and transferred to the Royal Signal Corps. He served in Greece, Crete, and the Middle East, and later, after specialised training in Kana Code, did a tour in Papua New Guinea with the "Army Special Wireless Group."

He was discharged as medically unfit with a knee injury in late 1944 and joined the Department of Civil Aviation, Communications Branch, during November 1944, serving at Rose Bay (four years); Norfolk Island (six years); Broken Hill (six years); Ceduna (2 years); and from 1968 until October 1977 was at Sydney Flight Service Centre in various supervisory and training positions. The last three and a half years saw him as Regional Flight Service Supervisor.

In his 33 years in aviation he progressed from basic operating tasks to the top position of his field in New South Wales — a great achievement!

George was a helpful, kind, competent person who was highly respected by all, as can be judged by the scores of tributes received by his wife Thelma and son, Robert.

Typical of George's benevolence in general, and to amateur radio in particular, he bequeathed his radio equipment, masts, aerials, etc to the Gold Coast Radio Society for furthering its activities.

Deepest sympathy is extended to George's wife Thelma and son, Robert.

—Ken Irwin VK4TR ex-VK2ELL

GORDON AUGUSTESEN VK4XG ex-VK4JN

"Gus", as he was known to his friends was 71 years old when he passed on at the Gold Coast after suffering poor health for the past few years.

Gus spent his whole working life associated with the electrical and electronics industry, consequently he was well known among the Brisbane electrical and radio wholesalers and retailers, pre and post World War II, when he served as a radar technician with the RAAF.

From *Astor Radio* Gus started his own business, *Tel Air,* specialising in Hi-Fi, television and amateur radio equipment, from which he retired to the Gold Coast some years ago while still enjoying amateur radio, particularly on 70 cm and with amateur television. The latter equipment was donated to Gold Coast amateurs by his son.

Gus was secretary of the WIA, Queensland Division for some three years post-war and pre-war particularly took part in Field Days and other experimental works.

As VK4JN, Gus broadcast records on 200 metres from Mitchelton.

Gus is survived by his wife Dawn, son Jeff and daughter Linda, to whom the sympathies of his amateur friends is passed.

—Contributed by Peter Brown VK4PJ

Solar Geophysical Summary

JULY

Solar activity was very low in July with no energetic flares being observed. Despite the low activity there were a number of small regions visible on the solar disk in the periods 3rd to 22nd and 27th to 31st. These regions maintained the 10 cm flux in the low 70s for much of the month and produced the relatively higher sunspot number for the month.

The region visible in the period, 27th to 31st was a "reverse polarity" region and so is characteristic of the next solar cycle rather than the present cycle. Such regions start to appear towards the end of each cycle, usually at higher solar latitudes. Old cycle and new cycle regions overlap for several years around the solar minimum period.

Despite the increased monthly sunspot number for July, the yearly averaged sunspot number has started to fall once again. The average value for January was 13.9. This is lower than the values observed since April 1985, which have been close to a value of 17.

The yearly averaged numbers for 1985 were 1/85=20; 2/85=19.1; 3/85=18.0; 4/85=17.8; 5/85=17.8; 6/85=17.5; 7/85=16.9; 8/85=16.6; 9/85=17.1; 10/85=17.4; 11/85=17.0; 12/85=15.4; 1/86=13.9.

The monthly average for 7/86 was 17.8 (6/86=0.8; 5/86=13.1).

The 10 cm readings for the month were: 1=67; 2=66; 3,4=67; 5=69; 6=72; 7=70; 8=69; 9=70; 10=73; 11=72; 12=71; 13-16=72; 17=73; 18=72; 19,20=71; 21=70; 22=71; 23-27=69; 28=70; 29=72; 30,31=71. Average was 70.3.

GEOMAGNETIC

July continued the recent trend of quiet months as are normal close to solar minimum. The most significant disturbed period was the period 24-27 with the A-index reaching a peak value of only 20.

July 2	The geomagnetic field was disturbed in the period 06- 1500 UTC. A=14
July 24-27	The geomagnetic field was disturbed after 1800 UTC on 24th and was at storm levels until 0000 UTC on 25th. The field was disturbed at times on 25-27th. A=16, 19, 20, 18 (17 on 29th).
July 29-30	The geomagnetic field was somewhat disturbed the entire day on 29th and the first half of 30th. A=11.11.

From data supplied by the *Department of Science, IPS Radio and Space Services,* July 1986.

ar

WHAT'S HAPPENING IN THE IONOSPHERE with VK2QL

For Sydney, MUFs were down 10 to 15 percent during the local daytime hours during July. The only disturbed period in Sydney was July 28, when ionospheric critical frequencies were slightly depressed during the day. In the Northern Hemisphere, ionospheric critical frequencies were depressed for the period July 22 to 31. Solar activity was expected to be low in September.

VK2QL has been going back through some records and logs, and those new to chasing DX may find some of the facts interesting.

One hears there is an 11 year cycle during which conditions reach their peak and bottom. This is not the case, for example, Cycle 21 is expected to bottom this year. Cycle 20 bottomed in 1976, Cycle 19 in 1963, and Cycle 18 in 1954, so on that short period we do not have one 11 year cycle.

In the Swiss Observatory bulletin for June 1976, they made the comment that in the first half of 1976, 42 sunspots had appeared, only six of them belonging to the new cycle, which is the current one. VK2QL has a copy of all cycles since 1700. Those who were active in DXing in the late 50s will remember the excellent conditions of Cycle 19, when the peak was over 200. The only cycle which approached that figure occurred in 1778 and that cycle lasted from 1775 to 1784.

ANNIVERSARY OF THE PCB

This year sees the 50th anniversary of the printed circuit board, which was invented in 1936 by Paul Eisler. Paul had a "tough road to hoe" with his invention in Britain, as he was advised that his invention would replace the production line which was much cheaper. The invention was then utilised in the United States in the manufacture of proximity fuses for shells during WWII.

In the late 1940s the US government decreed that all electronic circuits for airborne equipment be on PCBs.

QSP

RADCOM ACT INSPECTORS

The Department of Communications is asking all state police departments to appoint radio licensing inspectors. A DOC spokesman says the Australian Federal Police already have licensing inspector powers under the Radiocommunications Act, but they hope state police will appoint some of their officers as well to help enforce the Radcom Act. This will ultimately result in state police checking to see if radio transmitting equipment, particularly mobile and portable gear, is currently licenced.

DOC is to introduce a system whereby stickers would have to be placed on mobile or portable transceivers to help readily identify licenced equipment.

The Western Australian Police Commissioner has already agreed to appoint inspectors — making that State the first.

DOC estimates that unlicensed equipment costs it up to $6 million a year in lost revenue. It has also made it clear to the state police departments that it will work with them to combat radar jammers. Police in most States fear jammers will be used to interfere with police radar speed traps.

A leading US electronics magazine earlier this year featured a full constructional article on how to make one. The device could be set to give "false targets" to the police radar while the vehicle in which it was installed travelled well above the legal speed limit.

Use of a jammer, which is an illegal transmitter, and causing deliberate interference, are offences under the Radcom Act. The penalty is fines up to $10 000 and/or imprisonment to a maximum of five years.

Meanwhile, some state governments are moving to outlaw radar detectors, used in motor vehicles to give drivers in advance warning of police radar speed traps. These receivers are not covered by the Radcom Act — but state legislation is being considered to make it an offence to sell or possess a radar detector.

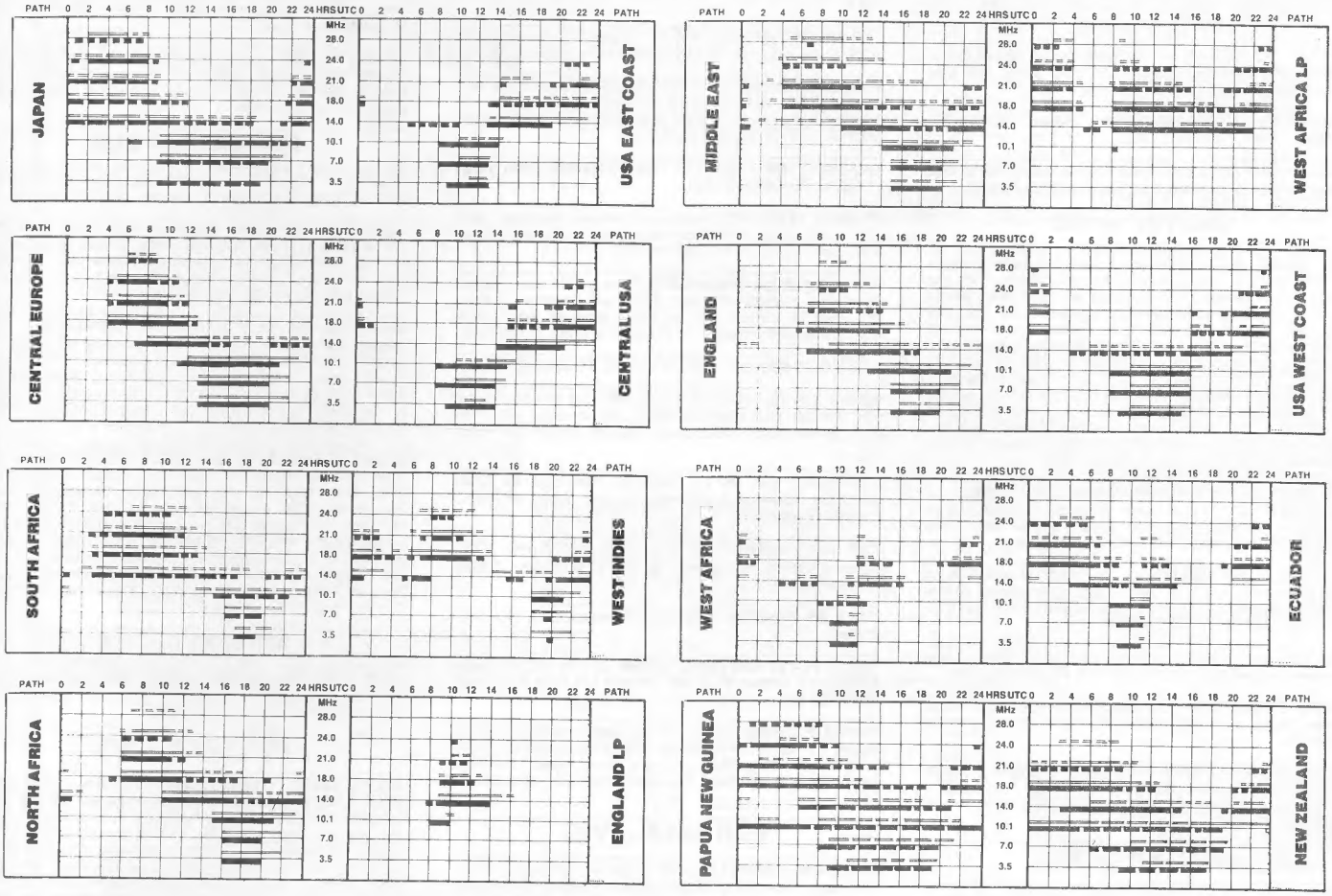
They can cost several hundred dollars and were sold by motoring and electronics shops. One retailers says he estimates one top model detector has sales of 10 000 throughout Australia. The unit imported from Japan, cost nearly $500 and had a range of up to five kilometres.

The New South Wales Government planned to introduce legislation soon to outlaw radar detectors and jammers — other states were also taking an interest.

—Submitted by Jim Linton VK3PC

Ionospheric Predictions

Len Poynter VK3BYE
14 Esther Court, Fawkner, Vic. 3060



LEGEND

From Western Australia (Perth)

From Eastern Australia (Canberra)

Mixed mode dependent on angle of radiation (long broken lines).

Better than 50% of the month, but not every day (continuous lines)

All paths unless otherwise indicated; (ie LP = Long Path) are Short Path.

Less than 50% of the month (short broken lines).

Predictions are presented courtesy of the Department of Science, IPS Radio and Space Services, Sydney.

Silent Keys

It is with deep regret we record the passing of —

MR BRUCE ATTWATER	VK2AZC
MR GORDON AUGUSTESEN	VK4XG
MR O L BROWN	VK3ARL
MR L A DANCEY	VK4LY
MR BILL DOUGLAS	VK3GA
MR GEORGE MEATON	VK4ASQ
MR R J NANKIVELL	VK5AJN

QSP

STOLEN EQUIPMENT

It is very pleasing to report that a Yaesu FT-708R UHF transceiver, stolen from B J Kennedy VK2XJD, has been recovered.

Hamads

PLEASE NOTE: *If you are advertising items FOR SALE and WANTED please write **each on a separate sheet of paper,** and include all details; eg Name, Address, Telephone Number, on both sheets. Please write copy for your Hamad as clearly as possible. Please do not use scraps of paper.*

* Please remember your STD code with telephone numbers
* Eight lines free to all WIA members. $9.00 per 10 words minimum for non- members
* Copy in typescript, or block letters — double-spaced to **Box 300, Caulfield South, Vic. 3162**
* Repeats may be charged at full rates
* QTHR means address is correct as set out in the WIA current Call Book

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.

Conditions for commercial advertising are as follows:

$22.50 for four lines, plus $2.00 per line (or part thereof)

DEADLINE

All copy for inclusion in the January 1987 issue of Amateur Radio, including regular columns and Hamads, must arrive at PO Box 300, Caulfield South, Vic. 3162, at the latest, by 9am, 10th November 1986.

Minimum charge — $22.50 pre-payable

Copy is required by the Deadline as indicated below the indexes on page 1 of each issue.

TRADE ADS

AMIDON FERROMAGNETIC CORES: Large range for all receiver and Transmitting Applications. For data and price list send 105x 220mm SASE to: **RJ & US IMPORTS,** Box 157, Mortdale, NSW. 2223. (No inquiries at office . . . 11 Macken Street, Oakley). Agencies at: Geoff Wood Electronics, Lane Cove, NSW. Webb Electronics, Albury, NSW. Truscott Electronics, Croydon, Vic. Willis Trading Co, Perth, WA. Electronic Components, Fishwick, Plaza. ACT.

ZZV ANTENNA FARM: Get with the action on ATV. We have antennas designed by Hi-Q Antennas for Channel 34. These antennas are available in both 10 and 18 elements. For further information and for all your antenna needs, contact ZZV Antenna Farm. VK2ZZV, QTHR. Ph:(049) 54 8688.

WANTED — NSW

BEAM: 3 element tribander. VK2TG, 17 Nelson Street, Engadine, NSW. 2237. Ph:(02) 520 4337.

BLUE COVERED WILLIAM ORR RADIO HANDBOOK: Prop Pitch Motor. Valve Bases for 813. Tcvr — TS-820S. Maurie VK2DCD, Box 72, Coleambally, NSW. 2707.

CIRCUIT DIAGRAMS: for Johnson Viking 352-D CB & Cobra- 138XLR-A CB. Both 40 ch SSB units. Will pay costs. Bob VK2VMX, QTHR. Ph:(063) 51 4217.

COMMUNICATIONS RECEIVER: Yaesu FRG-7700. VK2QC, QTHR. Ph:(044) 76 7927.

POWER SUPPLY: 13.8 VDC, 20 A Kenwood PS-30 for use with Kenwood tx TS-120S. VK2EJU. Ph:(065) 53 1365.

WANTED — VIC

ANY "RARE" RECORDINGS: of amateur radio contacts for Volume 2 of "The Sounds of Amateur Radio." We are particularly interested in recordings of contacts on Bands not now available to Australian amateurs, eg 112, 288 MHz, etc. We are also looking for recordings of unusual contacts, eg from Balloons, Aircraft, Submarines, etc. Any recording format can be handled from cylinders to CD. In the first instance please write to: Peter Wolfenden VK3KAU, c/- Federal Office, PO Box 300, Caulfield South, Vic. 3162. Please do not send recordings. Copies of Volume 1 "The Sounds of Amateur Radio" are still available for $7, plus post & packaging. Inquire at your Divisional Bookshop or the Federal Office.

COPY OF CIRCUIT DIAGRAM & SERVICE MANUAL: for Trio 9R-59D. Will pay all costs. Must be air mail to New Caledonia. Phillip Hardstaff, Maintenance Technician, SPC, BP D5, Noumea Cedex, New Caledonia.

HISTORICAL INFORMATION: Any leads on M A K Ryan or his relatives. He was the Founding President of the Amateur Wireless Society of Victoria (now WIA) 1911-12. Contact Jim Linton VK3PC, QTHR.

VALVES: 6AH6, 6GK6, 6KD6, VR105MT. Will accept reverse charge calls. VK3CNF, QTHR. Ph:(03) 723 1159.

YAESU FT-221 VHF 2m TRANSCEIVER: Also 6146 valves. Melbourne area. John VK3ABW, QTHR. Ph:(03) 568 7428.

YAESU or KENWOOD SEPARATE SPEAKER: to match Yaesu FT-101ZD or similar. Kenwood SP-100 15 cm wide x 11 cm deep with 9 cm speaker would be ideal. Roth Jones. (03) 870 3333 BH.

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TRANSVERTER: FTV-707, FTV-700, with 6m, 2m or 70 cm for FT-707. Must be in good condition. Also modem suitable for TRS 80 Colour Computer. Steve VK4KHQ QTHR. Ph:(077) 43 4508.

KENWOOD STATION MONITOR: SM-220. VK4ATQ, QTHR. Ph:(07) 374 1008

WANTED — SA

FC-107 ATU: (cream face unit if possible). FP-107 PSU module. Also DMS memory unit. All suit FT-107 t/rx. Ray VK5AVR, QTHR. Ph:(087) 62 2034.

FREQUENCY COUNTER: YC-601. Any information on the Yaesu YC- 601 frequency counter or if for sale please QSL to D A (Den) Sharp L50109, 142 East Terrace, Henley Beach, SA. 5022. Ph:(08) 356 8304. All replies answered promptly.

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HEATHKIT HW-9 QRP CW TRANSCEIVER: $180. Ross VK2EJE. Ph:(066) 49 7631.

HY-GAIN 18AVT/WB: multiband vertical. Excellent condition. $85. Also, KW Electronics traps for 80-10m dipole. $60. Larry VK2EOY. Ph:(02) 949 3124.

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KENWOOD 820: with MIC $500 ONO. Ph:(02) 759 1274.

KENWOOD TS-520S: HF, 2 mics; MC-10 & MC-60. 5 band trap vertical, plus manuals. $600, will separate. Also 10A peak power supply. $50. Dave VK2JDF. Ph:(043) 67 6629 AH.

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SALE BY TENDER: FRG-7700 Receiver. See VK2 Mini Bulletin.

YAESU FC-707 ANTENNA TUNER: as new with manuals. $200 ONO. Robert VK2EGR. Ph:(02) 674 3272 AH or (02) 669 7730 BH.

YAESU FT-680R: 6m all mode, good condition. $400. Yaesu FT- 480R 2m all mode, very good condition. $500. Icon IC-4E 70cm FM hand-held, very good condition. $300. All with manuals, etc. Colin VK2COL. Ph:(068) 42 2305.

FOR SALE — VIC

ATARI 400 COMPUTER: 16k, 3 games cartridges, basic cartridge, 2 joysticks, 1010 program recorder, reference & operator's manuals & book on Atari Basic. $250 the lot. Harold VK3ZRM, QTHR. Ph:(051) 69 1679.

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SHACK CLEARANCE: Icom IC-202 2m SSB transceiver. $100. DC6HL homebrew 25W linear amplifier to suit IC-202. $60. Icom IC-502 6m SSB transceiver. $80. Homebrew 20W linear amplifier to suit IC-502. $50. Marconi TF995A/3/5 signal generator (0.2 to 220 MHz) needs repair. $110. R A Ratcliffe Model 600 deviation monitor (70 to 510 MHz). $55. R A Ratcliffe model 202 AM/FM signal generator (50 to 220 MHz) needs repair. $55. Mullard 5ABBI cathode ray tube. $10. Greg VK4ZDC, QTHR. Ph:(076) 34 4276 AH.

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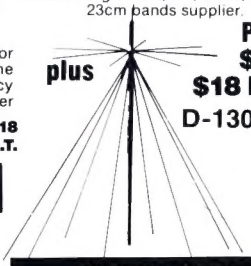

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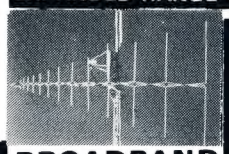

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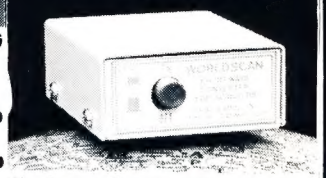

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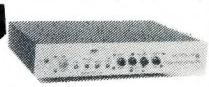

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